



# HIGH TOOL

### **Deliverable D2.2**

Final Structure of the HIGH-TOOL Model

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### **Glossary**

Air-IC	Sub module of the Passenger Demand module for intercontinental air transport
CGE	Computable General Equilibrium
СН	Switzerland
CO <sub>2</sub>	Carbon Dioxide
DG MOVE	European Commission's Directorate-General for Mobility and Transport
DG ECFIN	European Commission's Directorate-General for Economic and Financial Affairs
EC	European Commission
EPC	Economic Policy Committee
ETISplus	European Transport Policy Information System
EU	European Union
EU28	28 Member States of the European Union
EUR	Euros
EUROPOP2010	Eurostat Population Projections 2010-based
Eurostat	Statistical Office of the European Union
EXIOBASE	A global, detailed Multi-Regional Environmentally Extended Supply and Use/Input-Output Database.
EXIOMOD	A regional economic model, which allows advanced trade and transport scenario analysis on a national, regional and global scale.
EXIOPOL	Environmental accounting framework, which uses external data and input-output tools for policy analysis.
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GVA	Gross Value Added
HDV	Heavy-Duty Vehicle
HIGH-TOOL	Strategic high-level transport model
нт	HIGH-TOOL
1/0	In-/Output
IPR	Intellectual Property Rights
IWW	Inland Waterway
LDV	Light-Duty Vehicle
NO	Norway
NO <sub>x</sub>	Nitrogen Oxides
NST	Eurostat' Standard Goods Classification for Transport Statistics
NUTS	Nomenclature of Territorial Units for Statistics; A number assigned to it defines the level of granularity, such as 0 for the country level.
O/D	Origin/Destination; Used to describe a relation between two regions.
pkm	Passenger-kilometre
PM	Particulate Matter
RAEM	A spatial CGE model for the Netherlands, which explicitly considers interregional transportation and labour flows.

RHOMOLO	Regional Holistic Model
RoW	Rest of World
SO <sub>2</sub>	Sulphur Dioxide
TENtec	Information system of the European Commission to coordinate and support the Trans-European Transport Network Policy.
tkm	Tonne-kilometre
ТРМ	Transport Policy Measure
TPMs	Transport Policy Measures
TRANS-TOOLS	Network-based European Transport Model
TTv3	Research and development of the European Transport Network Model TRANSTOOLS Version 3 (FP7 research project).
vkm	Vehicle-kilometre
WP	Work Package

### **Executive Summary**

This deliverable reflects the work undertaken under *WP2: Structure of the HIGH-TOOL Model* and deals therefore with the second target of the overall project, the development of the final version of HIGH-TOOL. Based on user requirements illustrated by previous project work (Vanherle et al., 2014), user workshops at the client premises, and technical meetings of the consortium, framework conditions for the development of the model structure have been extracted and used to adjust the prototype version. This provided the basis on which to work out the set of tasks necessary to perform a policy measure investigation and to become even more detailed concerning the conceptual and logical structure of the HIGH-TOOL model. The structure defined for the final HIGH-TOOL version is shown in Table 1 whereby the components of the modules are defined.

Table 1: HIGH-TOOL model structure

Module	Components
Demography	Factors & Drivers   Historic data   Net migration   Europop Assumptions Population & Labour Force
Economy & Resources	Economy   Energy & Resources   GDP, Trade, Energy & Resources   Production & Attraction, Distribution (Trade)
Freight Demand	Impedances, Modal Split Parameters, Load Factors, Transit Country Distance Shares   Route Choice   Modal Split   Air Cargo   Conversion
Passenger Demand	Generation   Distribution & Modal Split   Impedances   Value of time, User Costs   Occupancy rates   Urban   Air-IC   Conversion
Vehicle Stock	Economic Factors   Fleet Characteristics   Vehicle Stock, User Costs
Environment	Emission Factors   Technology   Emissions
Safety	Mobility & Crash Data   Base Risk   Causal Variables   Impact Risk
Database	Database Interface
User Interface	Scenario Up-/Download   Policy Translator   Policy Request Report   User Input
Assessment	External Costs   Internal Market   Assessment Generator   Assessment Report

Beside the model structure, the interrelations and the data items to be exchanged have been defined. While the prototype had been developed based on the standard application Microsoft Excel (see Inception Report (Szimba et al., 2013)) the lessons learned from this exercise resulted in the decision to develop the final HIGH-TOOL version in JAVA which allows efficient maintenance as well as flexible access through the Internet. Figure 1 depicts the HIGH-TOOL model structure with the interrelationships among the different modules.

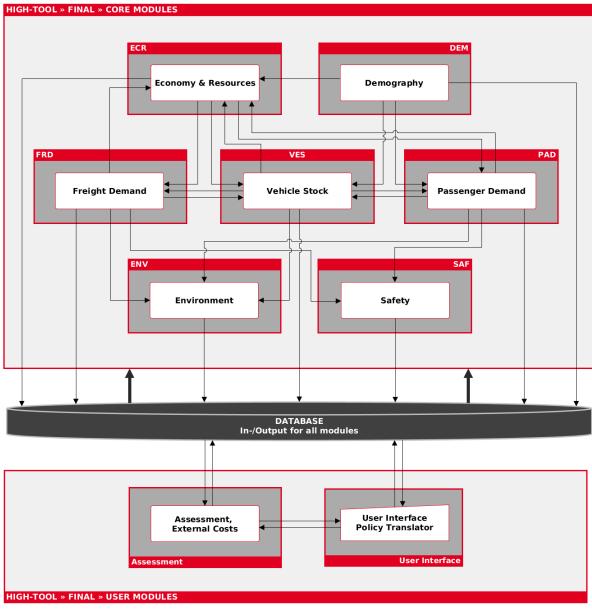


Figure 1: HIGH-TOOL model structure and module interrelationships

### 1 Introduction

This Deliverable deals with the different steps taken to line out the structure of the HIGH-TOOL model. It summarises work, carried out within the following tasks:

- Task 2.1: Grouping policy and transport relations
- Task 2.2: Model set and tool components to be developed
- Task 2.3: Input and output structure.

It started as a living document and evolved into its final structure by incorporating the permanent feedback from partners of WP1, WP2, WP3, WP4 and WP5. While the first Deliverable D2.1 provides the basic structure for a rapid development of the HIGH-TOOL prototype, the final deliverable of WP2 is represented by the current Deliverable D2.2, documenting the structure of the final HIGH-TOOL model.

This report is structured as follows:

- Basic model requirements: The main conclusions from the User Workshop important for the structure of the HIGH-TOOL model are summarised.
- Structure of the HIGH-TOOL model: The basic functionality and the model structure are depicted. Furthermore, the internal information flow is outlined and data items to be produced and exchanged are defined.
- Transport policy measures addressed by the HIGH-TOOL model: The policy measures
   HIGH-TOOL can address are displayed in conjunction with their policy levers and the model.

Providing an overview about the HIGH-TOOL model structure and the transport policy measures for assessing policy scenarios is the target of this document. To describe the overall structure of the HIGH-TOOL model it is necessary to dismantle the tool so that the different modules responsible for certain tasks are visible. To enhance the understanding of the working sequence of a module their basic components will be shown as well. Finally the links between the modules and components need to be outlined in detail to document the interfaces necessary for a proper interaction and information flow. With this information the user can recapitulate how the modules work and which interactions finally influence the results a policy measure is triggering. Finally the transport policy measures that the tool can address are outlined and the policy levers that can translate the policies are displayed.

An overview on the context of the HIGH-TOOL model, its features and structure is also provided by Szimba et al., 2015.

### 2 Basic Model Requirements

The chapter summarizes the key requirements which have been derived from either the call for proposals respectively Description of Work, workshops and surveys undertaken during the lifetime of the project. Based on the user requirements identified the technical composition of the equipment was derived.

### 2.1 Requirements for the Model Structure

According to the call for proposals, the Inception Report (Szimba et al., 2013) and the conclusions of the user workshops concerning user requirements (Vanherle et al., 2014; Purwanto et al., 2015) the main framework has been derived for the HIGH-TOOL model. It is summarised by Table 2.

Table 2: Requirements derived from the tender specification

Model feature	User requirement
Туре	Strategic high-level model derived from existing tools, models, equations and elasticities where possible and enriched by new models where necessary; no network model, but due to some policy measures a hyper-network approach reflecting the geographic scope below is available.
Geographic Scope	EU28, Norway and Switzerland on NUTS-2 level plus interrelations with the outside world on a NUTS-0 level for the neighbouring countries and on intercontinental country bundles for the Rest of the World.
Timeline	5-year steps from 2010 to 2050
Modes	Air, rail, road, bus, maritime, inland waterways, including the relevant vehicle technologies.
Transport Types	Passenger by trip purpose (business, private, vacation, commuter; for intercontinental passenger trips only business and non-business). Freight transport commodity (NST2, for air no commodities).
Distance bands	0–300 km, 300–1000 km, 1000+ km
<b>Model Sensitivity</b>	The dependent variables of a module have to be sensitive to a variety of independent variables to cope with the transport policy measures.
Validation	EU Reference Scenario 2013 with highest priority, and supplementary EU transport in figures - Statistical Pocketbook 2012 (published by DG MOVE, reflecting the Member States national statistics). Insofar possible also consistent with ETISplus and TENtec.
Tool	IPR free (except for the MS Office software run by the client), transparent, optimized in terms of runtime, flexible in policy input, user-friendly standalone solution is preferred, web access optional. Linking data and results between HIGH-TOOL and TRANSTOOLS possible (prerequisite is the aggregation of TTv3 data to the geographic scope of HT).

Reflecting upon the requirements above the conceptual framework for the strategic policy assessment tool evolves into a modular approach with seven core modules of the modelling part.

The following seven modules form the core of the modelling part:

- Demography (DEM)
- Economy & Resources (ECR)
- Passenger Demand (PAD)
- Freight Demand (FRD)
- Vehicle Stock (VES)
- Environment (ENV)
- Safety (SAF).

Furthermore, a Database ensures the data exchange between the modules, provides exogenous input for the modules and stores intermediate and output data. Finally, a user interface allows the operation of the model and provides access to assessment results.

### 2.2 User Requirements on Transport Policies

To determine the major fields of policy a user survey was conducted among policy specialists of the European Commission's Directorate-General Mobility and Transport (DG MOVE). The results show the focus of interest on five policy categories for consideration by the strategic assessment tool and six indicators to assess transport policy impacts, which are displayed in Table 3.

Table 3: Requirements on transport policy measures

## Policy categories Policy measures relating to the objectives of the internal market Internalisation of external costs Infrastructure charging Multimodal transport Safety

To specify in more detail the different policy categories publications of the European Commission have been investigated to identify transport policy measures (TPMs) which have to be addressed by the HIGH-TOOL model. Chapter 4 summarizes the selected transport policy measures (TPMs).

### 3 Structure of the HIGH-TOOL Model

This chapter illustrates the final structure of the HIGH-TOOL model. Furthermore, the reported adjustments of the prototype structure outlined in D2.1 (Mandel et al., 2013) have been considered. Compared to the prototype version, the structure of the final version of the HIGH-TOOL model is extended: feedback loops are considered, the content of the modules is extended, the data granularity increased from NUTS-0 to NUTS-2, the neighbouring regions are considered at NUTS-0 level and the "rest of the World" regions are embedded as intercontinental bundles of countries. As the final version is more powerful and has an extended geographic scope, and since the feedback loops increase the computational necessities, an application based on Microsoft Excel was no longer sufficient. Therefore it was decided to use the programming environment JAVA and the database PostgreSQL. This decision enables HIGH-TOOL to remain IPR free¹, avoiding commercial software and to widen the application for web access. Especially the web based server version contributes to an efficient maintenance service and the dissemination of HIGH-TOOL to any person of interest. Furthermore the IPR free characteristic of HIGH-TOOL serves as a research nucleus promoting an intensive use of the database and software to extend the capabilities.

### 3.1 Modules of the HIGH-TOOL Model

The modular framework for the strategic policy assessment tool consists of seven core modules covering the modelling part, a database to manage the data exchange and storage, and two user modules performing the assessment report and interfacing with the user.

The modules are interlinked as information produced is used in several modules. The general interrelationships among the modules are depicted in Figure 2 in context with the structure of the HIGH-TOOL model.

As the client runs the MS Office software package, the assessment reports are dedicated to this software package to be compatible throughout the work process. Nevertheless, also freely available software packages such as Open Office or Libre Office allows to open the policy assessment reports, with some format differences.

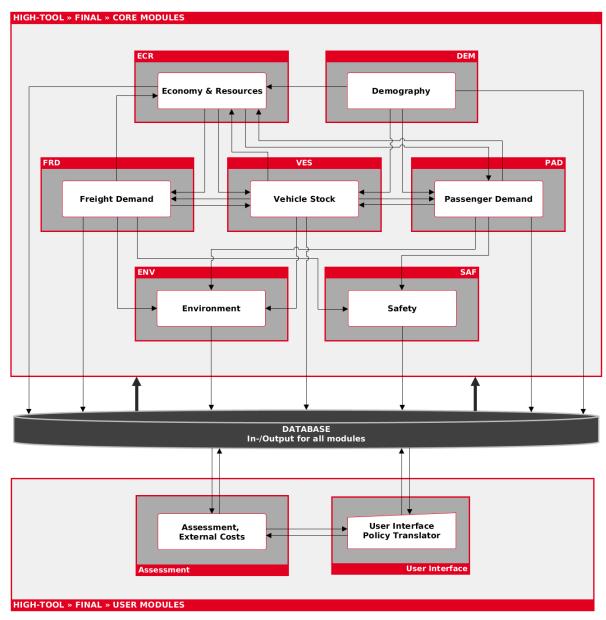


Figure 2: HIGH-TOOL model structure and module interrelationships

### 3.1.1 Features of the HIGH-TOOL Modules

The HIGH-TOOL model consists therefore of nine modules and a Database as shown in Table 4. The main features of these elements are summarised in Table 4.

Table 4: Main features of the modules of the HIGH-TOOL model

Module	Features in final HIGH-TOOL version
Demography (DEM)	The module deals with the development of the population and its structural changes. It reflects the EU Reference Scenario 2013 (EUROPOP 2010) and breaks down the values to NUTS-2 level.

Module	Features in final HIGH-TOOL version
Wiodule	reatures in iniai righ-100L version
Economy & Resources (ECR)	The module captures the effects of transport policies upon the economy. It is based on external input at national level (e.g. DG ECFIN projections for the short and medium term, following the agreement reached in the EPC and the EPC/DG ECFIN Ageing Report for the long-run).
Freight Demand (FRD)	The module deals with the mobility of goods and their structural changes under consideration of the available transport infrastructure and transport related policies.
Passenger Demand (PAD)	The module deals with the mobility of the population and its structural changes under consideration of the available transport infrastructure and transport related policies.
Vehicle Stock (VES)	The module deals with the development of the vehicle fleet considering the structural changes over time including propulsion technology.
Safety (SAF)	The module deals with fatalities, injuries, material damage and its changes.
Environment (ENV)	The module deals with emissions caused by transport activities.
Database (DB)	The module is responsible to provide and store all in- and output data of HIGH-TOOL.
Assessment	The module is responsible to generate the assessment report by providing tables and graphs. The assessment includes analyses about the competitive situation among modes and will summarize economic, environmental and transport safety-related impacts. It contains external costs as well as the welfare effects (e.g. changes in generalised costs).
User Interface (UI)	The module is responsible for the interaction with the user and will translate policy requests to be handled by the modules.

Please note that there are several loops between the modules. To cope with the runtime requested by the user to investigate a scenario the decision was taken to use a sequential approach of interaction. The sequential solution reduces the computation loops as the results of the previous periods t-1 would be used as input for calculations of period t<sup>2</sup>. An iterative process would be much more time consuming as the modules would interact, re-compute, store and read data several times until the results for a time period is available and the model moves forward to the next time period. The sequential approach avoids such swapping or data transfers while staying IPR free as requested in the Description of Work as expensive commercial optimization software solutions can be avoided.

### 3.1.2 Chronological Sequence of Module Calls

The chronological sequence of module calls starts with Demography module (DEM) to produce demographic outputs for t, under consideration of ECR inputs of the time step t-1.

The DEM module provides demographic data at regional level, ensuring consistency with the demographic forecasts underlying the EU Reference Scenario 2013. Demographic trends influence economic performance, passenger transport demand and demand for vehicles. Thus it provides inputs for time step t to ECR, PAD and VES.

<sup>&</sup>lt;sup>2</sup>Tests are still in process on the feasibility to allow the user a selection whether data for the 5-years intervals shall be produced in one computation step or five steps, the latter reflecting a yearly computation. In both cases the final results will be stored by 5 years steps.

Subsequently Economy & Resources module is run. Since the economic performance and resource consumption is dependent on transport activities, transportation costs, the type of vehicles purchased, as well as the labour force, ECR uses inputs from the modules Vehicle Stock, Passenger Demand, and Freight Demand of time step t-1, and of the DEM module of time step t. The ECR module supplies estimations of economic performance, such as purchase power, employment, and trade as well as of resource consumption. Economic indicators are an important driver of passenger and freight demand, as well as demand for vehicle stock. Thus ECR provides inputs to PAD, FRD and VES for t.

Afterwards VES is activated. Since the composition of the vehicle stock demand is dependent on the economic performance and demographic patterns, as well as on passenger and freight demand, VES receives inputs from ECR and DEM based on year t, PAD and FRD based on year t-1. Furthermore, it delivers outputs to PAD and FRD for time step t in terms of vehicle stock related costs, as well as to the Environment module (ENV) in terms of emission factors.

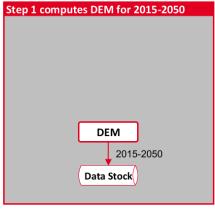
Following, the PAD and FRD modules are run. Passenger demand is influenced by economic and demographic pattern and thus requires inputs from DEM and ECR (year t). Furthermore, it requires vehicle stock related cost data from VES (year t). PAD's demand data are inputs for the calculation of environmental impacts (ENV) and safety indicators (SAF). Since passenger demand has an impact on the demand for vehicles and economic performance, it delivers demand data for the year t+1 to VES and ECR.

Freight demand is dependent on economic and trade-related characteristics, as well as on vehicle stock related cost data. Thus, ECR and VES provide inputs (year t) to FRD while FRD's demand data are provided to ENV and the Safety module for the computation of environmental and safety impacts. Freight demand has an impact on the demand for vehicles and the economy, thus FRD delivers demand data for the year t+1 to VES and ECR.

For the computation of environmental impacts, ENV applies passenger and freight demand data from PAD and FRD (year t), as well as data on vehicle fleet composition from VES (year t). For the calculation of safety impacts PAD and FRD provide demand data (year t) to SAF.

The tool's base year is 2010. Thus, the first time step 2015 is partly driven by 2010 results and 2020 by 2015 results etc.<sup>3</sup> Figure 3 illustrates the chronological sequence of a model run.

<sup>&</sup>lt;sup>3</sup> Within the validation process it will be checked whether explicitly the time lag using demand data of t-1 for the computation of VES data of year t causes large differences in the quality of model result.



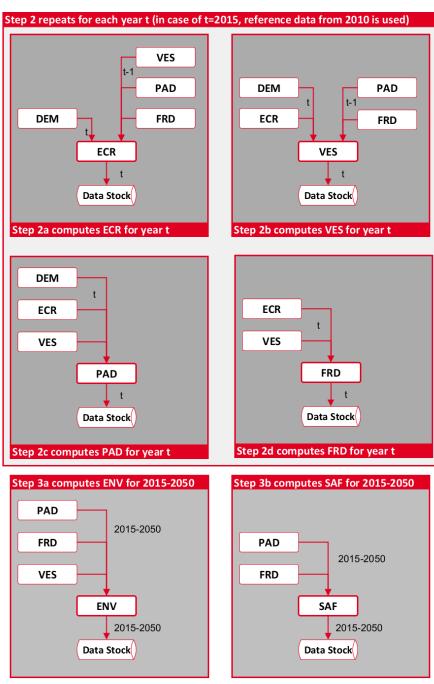


Figure 3: Chronological sequence of a HIGH-TOOL model run

### 3.2 Structure of the HIGH-TOOL Modules' Input/Output

As each module deals with a variety of policy issues and the problem complexity requires different steps of computation, the internal structure of the modules is structured by "components". As orientation Figure 4 displays the structure of the HIGH-TOOL model with its components and interdependencies. In the following this diversification is outlined textual at an intermediate level<sup>4</sup> and light is shed on the approaches used to generate the modules. Moreover to clarify the interrelationships of the modules the data items and information exchanged are outlined. For each module it is stated from and to where data are transferred and what types of data are delivered. To provide the user a link to the Database content first the variable identifier as listed in the Database is displayed followed by a verbal explanation of the variable.

Concerning the data granulation the model focuses on the EU28 Member States plus Norway and Switzerland on NUTS-2 level, while the neighbouring countries Turkey, Bosnia Herzegovina, Albania, Serbia, Montenegro, Republic of Macedonia, Moldova, Belarus, Ukraine and Russia (west of Urals) are treated on NUTS-0 level. The Rest of the World is reflected by 19 intercontinental bundles consisting out of the countries of the geographic region of the bundle. The intercontinental bundles are defined in Table 5.

Table 5: Intercontinental bundles

Intercontinental bundles
Iceland
Africa North
Africa Central South
Africa East
Middle East Mediterranean
Middle East East
Commonwealth of Independent States
Russia east of Urals
Asia/Pacific Indian Subcontinent
Asia/Pacific Southern Asia
Asia/Pacific Australia/Oceania
Asia/Pacific Far East
America Canada
America USA
America Mexico

<sup>&</sup>lt;sup>4</sup> The detailed structure of the modules can be found in the dedicated Deliverables of WP4 and WP5.

### Intercontinental bundles America Central America Caribbean America South Antarctica

The latter is not considered further as the traffic originating and destination in this region is out of scope of the HIGH-TOOL model purposes.

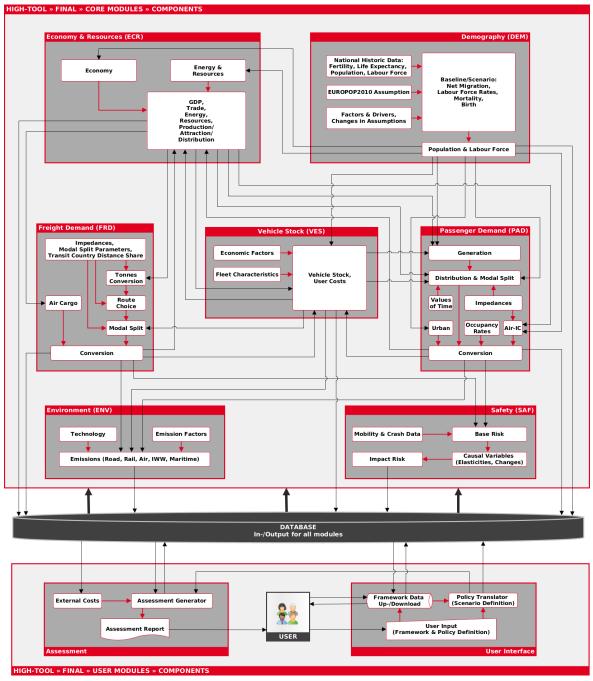


Figure 4: HIGH-TOOL model with its components and interrelationships

As a time horizon the module components deliver results for the period 2010 to 2050 in 5-year steps to meet the runtime requirements.

For a detailed mathematical description of the models the reader is referred to the upcoming Deliverable D4.3 and the Interim Report on the Economy & Resources module (Ivanova, 2015). A detailed description of the Database can be found in D3.1 (Kiel et al., 2015). Deliverable D6.1 (Biosca et al., 2015) outlines the design of the user interface and the assessment reports. Finally the overall HIGH-TOOL model is reflected in the upcoming Deliverable D5.3. The Deliverables stated reflect upon intermediate versions of the final HIGH-TOOL model. Thus, the variables listed in these documents are under revision, while variable names and descriptions listed in Deliverable D2.2 are the final ones as stored in the final database. The Deliverables D4.4, D3.2, D5.3, and D6.2 are upcoming Deliverables referring to the final version of the HIGH-TOOL model and substitute the above mentioned ones.

### 3.2.1 Demography

The Demography model follows the classical approach of a cohort model. For each of the 30 countries (EU28 plus Norway and Switzerland) demographic drivers are used to estimate the population. Starting point is the component 'Historic Data' displaying information about the historic development 2005 up to 2010 where fertility and mortality rates are extracted which then are extrapolated by the component 'EUROPOP 2010 Assumptions' into the future by using population trends and specifically the EUROPOP2010 NUTS-0 level assumptions on total fertility rate, life expectancies at birth and net migration as well. In this way, the computations are calibrated towards the EU Reference Scenario 2013. Moreover, the component 'Baseline/Scenario' explores intra-national migration growth rates at NUTS-2 level which are derived internally by the module from investigated trends or externally from the user which concern factors, drivers or changes in assumptions (component 'Factors & Drivers, Changes in Assumptions'). Finally the component 'Population & Labour Force' generates the baseline scenario and the last component provides as detailed, output population and labour force per region.

A feedback loop exists within the module Economy & Resources. Concerning the information flow to and from the Demography module the following data items will be exchanged.

### Exogenous **input** from Database:

- i\_de\_labour\_hist Historic labour force (1995–2010) by region if available per age and gender cohort
- i\_de\_labour\_perc Labour force assumptions in percent by region per age and gender cohort

- i\_de\_death Historic number of deaths per country, age and gender cohort
- i\_de\_pop\_disag Historic shares of population 2010 in percent by region per age and gender cohort
- i\_de\_pop\_eurostat Historic population (1995-2010) by region, age and gender cohort
- i\_de\_life\_men Projected life expectancy for men for EU27 + CH + NO
- i\_de\_life\_women Projected life expectancy for women for EU27 +CH +NO
- i\_de\_net\_migration Projected net migration (emigration-immigration) for EU27 +CH +NO
- i\_de\_tot\_fert\_rate Projected total fertility rate for EU27 +CH +NO
- i\_de\_urban Urbanisation proxy per NUTS-2 region
- i\_de\_eu\_ref Calibration coefficients for EUROPOP2010 by year, country (EU27 + NO + CH), age groups (0,5, ..., 75) and gender (0,1)

### **Output** to the Database:

- o\_de\_labour Labour force by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously
- o\_de\_pop Projected population by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously

### **Output** to other HIGH-TOOL core modules:

### **Economy & Resources**

- o\_de\_labour Labour force by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously
- o\_de\_pop Projected population by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously

### Vehicle Stock

• o\_de\_labour – Labour force by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously

### Passenger Demand

- o\_de\_labour Labour force by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously
- o\_de\_pop Projected population by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously

### 3.2.2 Economy & Resources

The Economy & Resource model is based on the knowledge of three CGE models: EXIOMOD<sup>5</sup>, RAEM Europe<sup>6</sup> and RHOMOLO<sup>7</sup>. Due to runtime limitations, the extensive data requirements and a more strategic concept of HIGH-TOOL, the Economy & Resource module is simplified by replacing some components of the above-mentioned models by parameters calibrated based on predefined scenarios by applying a full CGE model. The module consists of the three components 'Economy', 'Energy & Resources', and the combinatorial component 'GDP, Trade, Energy, Resources, Production/Attraction, Distribution' concentrating the module's sensitivity to changes in the socio-economy based on transport related issues. The general drivers (i.e. GDP, household income per capita and population) are exogenously defined by the EU Reference Scenario 2013 and the module will disaggregate these drivers from NUTS-0 to NUTS-2 level based on regional population and labour force. The module provides an estimation and projection of employment, trade, resource consumption and purchase power under different transport policies.

Feedback loops exist within the modules Demography, Passenger and Freight Demand as well as Vehicle Stock. Concerning the information flow to and from the Economy & Resource module the following data items are exchanged.

<sup>&</sup>lt;sup>5</sup> EXIOMOD is one of a number of regional economic models that allow advanced trade and transport scenario analysis on a national, regional and global scale. The database of EXIOMOD model comes from the FP7-EXIOPOL database (EXIOBASE). For the prototype, EXIOBASE is used as one data source, but for the final version EXIOMOD might be used for more complicated calculation.

<sup>&</sup>lt;sup>6</sup> RAEM is a spatial CGE model and explicitly considers interregional transportation and labour flows. For the labour market both commuting and migration are taken into account.

RHOMOLO is a new dynamic general equilibrium framework for evaluating EU Cohesion Policy under consideration of environmental and social indicators. The model has both regional and sectoral dimensions regionally, the aim is for complete NUTS-2 (NUTS-1 for Germany) coverage of the EU28, while the potential sector coverage is 23, all of which leads to very large modelling dimensions and presents challenges in terms of data availability. The model is constructed using the concept of Dynamic Spatial Computable General Equilibrium (DSCGE), which ensures Walrasian equilibrium in a sequence of model solutions over time and also incorporates elements of New Economic Geography (NEG) in the way it captures the forces of economic agglomeration and dispersion.

### Exogenous **input** from Database:

- p\_er\_g\_gva Growth rate of gross value added
- p\_er\_alpha\_i Output elasticity of labour by region and sector, i.e., the share of labour of total Gross Value Added. Used as an input parameter for the Cobb-Douglas function
- p\_er\_g\_gdp Growth of GDP (2010-2050) by country
- p\_er\_alpha\_i\_tot Output elasticity of labour by country and sector, i.e., the share of labour of total Gross Value Added. Used as an input parameter for the Cobb-Douglas function
- p\_er\_io IO-coefficient matrix by region and sectors (year 2010)
- p\_er\_p Consumer prices of goods and services
- p\_er\_beta Cobb Douglas Utility parameter
- p\_er\_eta Sensitivity parameter (in trade)
- p\_er\_d Destination parameter (input for the trade gravity model)
- p\_er\_o Origin parameter (input for the trade gravity model)
- p\_er\_epsilon Elasticity parameter of accessibility by sector, i.e., sensitivity of regional accessibility (e.g. transport costs) to sectoral output
- p\_er\_tc Consumption tax rate
- p\_er\_delta Depreciation rate
- p\_er\_phi Gross fixed capital formation as a percentage of GDP
- p\_er\_delta\_ks\_tot Change in capital supply
- p\_er\_delta\_ls Change in labour supply
- p\_er\_gdp\_scaler GDP scaler (Parameter to calculate GDP growth in the policy scenarios.)
- p\_er\_pd Producer prices
- p\_er\_delta\_ls\_tot Change in total labour supply
- i\_er\_delta\_acc Change in accessibility of a region
- i\_er\_l\_tot Total labour input by region and sector
- i\_er\_xd\_tot Total output per sector in millions of EUR by country and sector
- i\_er\_k\_tot Total capital input in millions of EUR by country and sector
- i\_er\_xd Total output per region and sector in millions of EUR
- i\_er\_gva Gross value added in millions of EUR by country and sector
- i\_er\_delta\_inv Change in public and private investments into fixed capital formation by region

- i\_er\_delta\_inf\_inv Change in public and private transport infrastructure investments by region
- i\_er\_delta\_rtd Change in public and private investments in research and technology development (RTD) by region
- i\_er\_gdp GDP in millions of EUR by country
- i\_er\_delata\_acc Change in accessibility of a region
- i\_er\_sectorshare Sectoral share per country per year

### Endogenous input from HIGH-TOOL core modules:

### Demography

- o\_de\_labour Labour force by region (EU28 + CH + NO), age and gender cohort.
   RoW outputs prefilled from UN projections exogenously
- o\_de\_pop Projected population by region (EU28 + CH + NO), age and gender cohort.
   RoW outputs prefilled from UN projections exogenously

### Vehicle Stock

- o\_vs\_tax\_revenues Generated tax revenues in EUR at country level
- o\_vs\_purch Total new vehicle purchase cost in EUR distinguished by modes at country (NUTS-0) level
- o\_vs\_cstavggen\_fix\_vkm Average generalised fixed cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_veh\_stock\_n2 Detailed Vehicle stock in vehicles by region (NUTS-2 level), mode, fuel and vehicle type
- o\_vs\_vkm\_n2 Detailed generated vkm by region (NUTS-2 level), vehicle type, mode and fuel type

### Freight Demand

- o\_fd\_tkm\_od Tonne kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_total\_costs\_od Total transport cost in EUR per tonne by origin/destination at NUTS-2 level per mode, commodity and distance band

- o\_fd\_vkm\_od Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_t\_od Tonnes by origin/destination at NUTS-2 level per mode, commodity and distance band
- i\_fd\_toll\_costs Average toll cost in EUR/vkm by country and mode

### Passenger Demand

- o\_pd\_pkm\_od Passenger kilometres generated by outgoing trips by origin/destination and mode. Returning trip pkm are not included
- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode. Returning trip vkm are not included
- o\_pd\_trips\_od Aggregated trips by origin/destination and mode. Returning trips are not included
- o\_pd\_od\_fix\_cost Fixed cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_pd\_od\_time\_cost Time cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_od\_toll\_cost Toll cost in EUR generated by outgoing trips by origin/destination and mode.

  Returning trip costs are not included
- o\_pd\_var\_cost Variable cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions. Returning trip pkm are not included
- o\_pd\_airic\_costae\_od Aggregated access/ egress costs in EUR from the regions to the airports generated by trips from European region to RoW region.
   Returning trip costs are not included
- o\_pd\_airic\_costnet\_od Aggregated net transport costs in EUR from the regions to the airports generated by trips from European region to RoW region.
   Returning trip costs are not included
- o\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions. Returning trips are not included

### **Output** to the Database:

o\_er\_gdp - Gross domestic product (GDP) in million EUR

- o\_er\_gdp\_capita GDP per capita per region
- o\_er\_cons\_capita Consumption per capita per region
- o\_er\_labour\_new Labour supply after policy measures in people by region and sector
- o\_er\_wage\_new Wage (index) after policy measures by region
- o\_er\_return\_new Return on capital after policy measures by region and commodity
- o\_er\_income Income in region in millions of EUR by region
- o\_er\_PD\_new Production prices of commodities after policy measures by region and commodity
- o\_er\_P\_new Prices of commodities after policy measures by region and commodity
- o\_er\_trade\_new Trade after policy measures in millions of EUR from origin region to destination region (at NUTS-2 level) per commodity
- o\_er\_employment Employment in people by region and sector
- o\_er\_income\_capita Income per capita by region
- o\_er\_co2 CO<sub>2</sub> emissions without combustion per sector per region
- o\_er\_sox SO<sub>x</sub> emissions in CO<sub>2</sub> equivalent kg (without combustion) per sector per region
- o\_er\_nox NO<sub>x</sub> emissions without combustion per sector per region
- o\_er\_PM PM emissions in CO<sub>2</sub> equivalent kg (without combustion) per sector per region
- o\_er\_biomass Biomass in kilotonnes per sector per region
- o\_er\_wood Wood in kilotonnes per sector per region
- o\_er\_metal\_ores Metal ores in kilotonnes per sector per region
- o\_er\_water Water use in Mm<sup>3</sup> (Million cubic meter) per sector per region
- o\_er\_minerals Minerals in kilotonnes per sector per region
- o\_er\_fossilfuel Fossil Fuels in kilotonnes per sector per region
- o\_er\_gva Gross value added in millions of EUR by region and sector
- o\_er\_hh\_consumption Household consumption in millions of EUR by region and sector
- o\_er\_int\_input Intermediate inputs in millions of EUR by region and sector
- o\_er\_prod\_tax Production taxes in millions of EUR by region and sector
- o\_er\_cap\_returns Capital returns in millions of EUR by region and sector
- o\_er\_cap\_stock Capital stock in millions of EUR by region and sector
- o\_er\_output Total output in millions of EUR by region and sector
- o\_er\_tot\_emissions Total emissions by region and sector
- o\_er\_wages Wages in millions of EUR by region and sector

- o\_er\_price\_index Welfare measure, price index on commodity level
- o\_er\_indirect\_utility Indirect utility
- o\_er\_value Trade in thousands of EUR from origin region to destination region (NUTS-2)
   per commodity

### **Output** to other HIGH-TOOL core modules:

Vehicle Stock

o\_er\_gdp\_capita - GDP per capita per region

### Freight Demand

 o\_er\_trade\_new - Trade after policy measures in millions of EUR from origin region to destination region (at NUTS-2 level) per commodity

### Passenger Demand

- o\_er\_gdp GDP in millions of EUR by region
- o\_er\_empl Employment in people by region and sector
- o\_er\_income Income in region in millions of EUR by region
- o\_er\_gva Gross value added in millions of EUR by region and sector

### 3.2.3 Freight Demand

The Freight Demand model is divided into three parts dealing with: air cargo, land-/waterbound freight and the conversion of intermediate results. The main part embraces several components to generate the freight types for all modes except air. While the first component 'Impedances, Modal Split Parameters, Transit Country Distance Share' pre-processes impedances, transit shares and external parameters for the three subsequent components generating the freight types for all other modes. The subsequent components convert trade values into tonnes (component 'Tonnes conversion'), execute route choice (component 'Route Choice') and compute the modal split (component 'Modal Split'). The second part consists of an independent component to determine air cargo (component 'Air Cargo'), which is derived from COMEXT data (import and export values) provided by Eurostat for the air mode. The last component 'Conversion' converts al intermediate mode specific results into performance values.

Feedback loops are foreseen with the modules Economy & Resources and the Vehicle Stock modules. Concerning the information flow to and from the Freight Demand module the following data items are exchanged.

### Exogenous **input** from Database:

- i\_fd\_region\_share Country leg distance shares of travelled distance in the country in percent by NUTS-2 level origin/destination, country and mode of the total travelled distance
- i\_fd\_imp\_dist Distance impedances in kilometres by origin/destination at NUTS-2 level per distance band and mode
- i\_fd\_toll\_cost Average toll cost in EUR/vkm by country and mode
- i\_fd\_trade\_air Air trade in 2010 in tonnes by region
- i\_fd\_route\_choice Ton share in percent of route chain at NUTS-2 level, using at most two transhipment points between origin / destination
- p\_fd\_fixed\_cost Average fixed costs for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_var\_cost Average variable costs for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_fuel\_cost Average energy costs for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_load\_factor Average load rate for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_load\_capacity Average load capacity for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_speed Average speed for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_load\_time Average loading time for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_unload\_time Average unloading for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_wait\_time Average waiting time for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_utilities- Mode utility function parameter per commodity
- p\_fd\_air\_param Air demand annual growth factor depending on origin/destination relationship
- p\_fd\_trade\_value Commodity value in EUR (2010 constant prices) by origin country/ destination country
- p\_fd\_air\_share\_full\_freight Share of freight transported by air cargo liners

### Endogenous input from HIGH-TOOL core modules:

### **Economy & Resources**

 o\_er\_trade\_new – Trade after policy measures in millions of EUR from origin region to destination region (at NUTS-2 level) per commodity

### Vehicle Stock

- o\_vs\_cstavggen\_fix\_tkm Average generalised fixed cost in EUR per tonne kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type

### Output to the Database:

- o\_fd\_tkm\_od Tonne kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_vkm\_od Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_t\_od Tonnes by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_total\_cost\_od Total transport cost in EUR per tonne by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_vkm\_transit Freight mobility in a country including transit in vehicle kilometres by country, distance band and mode
- o\_fd\_tkm\_transit Freight performance on the territory of a country including transit in tonne kilometres by country, distance band and mode
- o\_fd\_air\_demand\_od\_t Air demand projected transported in full freight aircraft in tonnes by origin/destination at NUTS-2 level
- o\_fd\_air\_demand\_od\_tkm Air demand performance transported in full freight aircrafts in tonne kilometres by origin/destination at NUTS-2 level
- o\_fd\_air\_demand\_od\_vkm Air demand mobility transport in full freight aircrafts in vkm by origin/destination at NUTS-2 level
- o\_fd\_air\_demand\_t\_od Total air demand projected in tons by origin/destination at NUTS-2 level

### **Output** to other HIGH-TOOL core modules:

### **Economy & Resources**

- o\_fd\_tkm\_od Tonne kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_total\_costs\_od Total transport cost in EUR per tonne by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_vkm\_od Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- o\_fd\_t\_od Tonnes by origin/destination at NUTS-2 level per mode, commodity and distance band
- i\_fd\_toll\_costs Average toll cost in EUR per vkm by country and mode

### Vehicle Stock

- o\_fd\_vkm\_od Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- p\_fd\_load\_factor Average load rate for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_load\_capacity Average load capacity for freight transport in EUR per vkm (no differentiation by country)

### Environment

 o\_fd\_vkm\_od - Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band

### Safety

 o\_fd\_vkm\_transit - Freight mobility in a country including transit in vehicle kilometres by country, distance band and mode

### 3.2.4 Passenger Demand

The Passenger Demand model follows largely the classical "four-step approach" of transport demand modelling (without the fourth step, network assignment) and consists of the three components: 'Generation', 'Distribution & Modal split' and 'Conversion'. The generation model computes the trip demand for each origin. The distribution model calculates the O/D trip matrix and the modal split model further distinguishes the O/D matrix by transport modes whereby the components 'Values of Time' and 'Impedances' provide necessary information.

The component 'Impedances' also delivers information to the component 'Air-IC' which generates the intercontinental air transport demand. The urban transport demand is computed by the component 'Urban'. All aforementioned components conclude with the component 'Conversion' which converts the intermediate results into outputs for other HIGH-TOOL core modules and the Database.

A hyper-network approach is utilized for rail and road to allow corridor scenarios on an abstract level. The capitals of each zone are used as network nodes and a hyper-network link connects two neighbouring zones if they are connected via rail or road. Policies can influence time and distance weights in the network. Changes in times and distances on O/D level are used to change the reference impedance matrices from ETISplus.

There are feedback loops with the modules Economy & Resources and Vehicle Stock. Concerning the information flow to and from the Passenger Demand module the following data items are exchanged.

### Exogenous **input** from Database:

- i\_pd\_coef\_transitshare Static transit share factor by origin/destination, country and mode (not used if hypernet submodule is active)
- i\_pd\_coef\_occupancy\_rate Occupancy rate for car by country, purpose and mode
- i\_pd\_imp\_net\_time Network travel time in minutes by origin/destination and mode
- i\_pd\_imp\_ae\_time Access/egress travel time in minutes by origin/destination and mode
- i\_pd\_imp\_net\_dist Network travel distance in kilometres by origin/destination and mode
- i\_pd\_imp\_ae\_dist- Access/egress travel distance in kilometres by origin/destination and mode
- i\_pd\_imp\_delta\_los Level of Service indicator by origin/destination and mode
- i\_pd\_imp\_ref\_dist Crow flies distance in kilometres by origin/destination
- i\_pd\_exogenous\_hotel Number of hotels by region
- i\_pd\_exogenous\_bed Number of accommodation opportunities by region
- i\_pd\_exogenous\_area Region area in square kilometres by region
- i\_pd\_exogenous\_radius Average region radius in kilometres by region
- i\_pd\_ref\_dist Average trip length in kilometres by urban mode in the reference year 2010
- i\_pd\_core\_toll\_cost Average passenger transport toll costs in EUR per vkm by country and mode
- i\_pd\_citydwellershare Percentage of NUTS-2 population living in cities and direct catchment areas

- i\_pd\_referencedemand Observed trip demand per capita per day in the reference year 2010
- i\_pd\_aecost Access/egress costs in EUR by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_aircost Ticket costs in EUR by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_aetime Access/egress time in minutes by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_airmodetime Flight time in minutes by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_freq Level of service frequency by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_airdist Flight distance in kilometres by air intercontinental origin/destination and air purpose for the reference year 2013
- i\_pd\_referenceflow Observed travellers in reference year by air intercontinental origin/destination and air purpose for the reference year 2013 (returning trips are not included)
- i\_pd\_referencepopulation Population in the reference year 2013 by region
- i\_pd\_urban\_duaetime Policy lever for change in access/ egress time for urban passenger transport modes, in percent
- i\_pd\_urban\_dutoll Policy lever for change in urban cordon toll costs for passenger cars and powered 2-wheelers
- i\_pd\_urban\_dutraveldist Policy lever for change in travel distance for urban passenger transport modes, in percent
- i\_pd\_urban\_dutraveltime Policy lever for change in travel time for urban passenger transport modes, in percent
- i\_pd\_capital Name of zone capital
- i\_pd\_capital\_lat Latitude of zone capital
- i\_pd\_capital\_long Longitude of zone capital
- i\_pd\_ae\_dist Access/egress travel distance to network in kilometres by region and mode
- i\_pd\_ae\_dist\_weight Policy lever for change in passenger transport access/ egress distance to the hypernet by region and mode, in percent
- i\_pd\_ae\_time Access/egress travel time to network in minutes by region and mode

- i\_pd\_ae\_time\_weight Policy lever for change in passenger transport access/ egress time to the hypernet by region and mode, in percent
- i\_pd\_link\_dist Passenger transport net distance by hypernet link and mode
- i\_pd\_link\_dist\_weight Policy lever for change in passenger transport net distance by hypernet link and mode, in percent
- i\_pd\_link\_time Passenger transport net time by hypernet link and mode
- i\_pd\_link\_time\_weight Policy lever for change in passenger transport net time by hypernet link and mode, in percent

# Endogenous input from HIGH-TOOL core modules:

# Demography

- o\_de\_labour Labour force by region (EU28 + CH + NO), age and gender cohort.
   RoW outputs prefilled from UN projections exogenously
- o\_de\_pop Projected population by region (EU28 + CH + NO), age and gender cohort.
   RoW outputs prefilled from UN projections exogenously

## **Economy & Resources**

- o\_er\_gdp GDP in millions of EUR by region
- o\_er\_empl Employment in people by region and sector
- o\_er\_income Income in region in millions of EUR by region
- o\_er\_gva Gross value added in millions of EUR by region and sector

## Vehicle Stock

- o\_vs\_veh\_stock Detailed vehicle stock in vehicles by country, mode, fuel and vehicle type
- o\_vs\_cstavggen\_fix\_vkm Average generalised fixed cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_fix\_pkm Average generalised fixed cost in EUR per passenger kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_pkm Average generalised variable cost in EUR per passenger kilometre by country, mode and fuel type

# **Output** to the Database:

- o\_pd\_od\_fix\_cost Fixed cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_pd\_od\_time\_cost Time cost in EUR generated by outgoing trips by origin/destination and mode (returning trip costs are not included)
- o\_pd\_od\_toll\_cost Toll cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_pd\_od\_var\_cost Variable cost in EUR generated by outgoing trips by origin/destination and mode. Returning trip costs are not included
- o\_pd\_orig\_fix\_cost Fix cost in EUR generated by trips by origin region and mode
- o\_pd\_orig\_time\_cost Time cost in EUR generated by trips by origin region and mode
- o\_pd\_orig\_toll\_cost Toll cost in EUR generated by trips by origin region and mode
- o\_pd\_orig\_var\_cost Variable cost in EUR generated by trips by origin region and mode
- o\_pd\_transit\_fix\_cost Aggregated total fixed costs in EUR including transit by country and mode
- o\_pd\_transit\_time\_cost Aggregated total time costs in EUR including transit by country and mode
- o\_pd\_transit\_toll\_cost Aggregated total toll costs in EUR including transit by country and mode
- o\_pd\_transit\_var\_cost Aggregated total variable costs in EUR including transit by country and mode
- o\_pd\_pkm\_od Passenger kilometres generated by outgoing trips by origin/destination and mode. Returning trip pkm are not included
- o\_pd\_pkm\_orig Passenger kilometres generated by trips by origin region and mode. Returning trip pkm are not included
- o\_pd\_pkm\_transit Aggregated total passenger kilometres including transit by country and mode
- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode.
   Returning trip vkm are not included
- o\_pd\_vkm\_orig Aggregated vkm by origin region and mode
- o\_pd\_vkm\_transit Aggregated total vkm including transit by country and mode
- o\_pd\_trips\_od Aggregated trips by origin/destination and mode (returning trips are not included)

- o\_pd\_trips\_orig Aggregated trips by origin region and mode
- o\_pd\_urban\_pkm\_ctry Total urban passenger kilometres by country, urban mode, simple age group and gender
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender
- o\_pd\_urban\_trips\_ctry Total urban trip demand by country, urban mode, simple age group and gender
- o\_pd\_pkm\_transit\_safety Aggregated total passenger kilometres including transit by country, mode, simple age groups and gender
- o\_pd\_pkm\_orig\_safety A Aggregated passenger kilometres by origin, mode, simple age groups and gender
- o\_pd\_trips\_orig\_safety Aggregated trips by origin region, mode, simple age groups and gender cohort
- o\_pd\_airic\_costae\_od Aggregated access/egress costs in EUR from the regions to the airports generated by trips from European region to RoW region (returning trip costs are not included)
- o\_pd\_airic\_costnet\_od Aggregated net transport costs in EUR from the regions to the airports generated by trips from European region to RoW region (returning trip costs are not included)
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)
- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)
- o\_pd\_vkmdistancebandctry Aggregated vkm by originating country, distance band, mode
- o\_pd\_pkmdistancebandctry Aggregated pkm by originating country, distance band, mode
- o\_pd\_imp\_aenet\_dist Modelled access/egress travel distance in kilometres by region and mode
- o\_pd\_imp\_aenet\_time Modelled access/egress travel time in minutes by region and mode
- o pd imp hnet dist Modelled network travel distance in kilometres by region and mode
- o\_pd\_imp\_hnet\_time Modelled network travel time in minutes by region and mode

# **Output** to other HIGH-TOOL core modules:

## **Economy & Resources**

- o\_pd\_pkm\_od Passenger kilometres generated by outgoing trips by origin/destination and mode (returning trip pkm are not included)
- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode(returning trip pkm are not included)
- o\_pd\_trips\_od Aggregated trips by origin/destination and mode(returning trip pkm are not included)
- o\_pd\_od\_fix\_cost Fixed cost in EUR generated by outgoing trips by origin/destination and mode (returning trip costs are not included)
- o\_pd\_od\_time\_cost Time cost in EUR generated by outgoing trips by origin/destination and mode (returning trip costs are not included)
- o\_od\_toll\_cost Toll cost in EUR generated by outgoing trips by origin/destination and mode (returning trip costs are not included)
- o\_pd\_var\_cost Variable cost in EUR generated by outgoing trips by origin/destination and mode (returning trip costs are not included)
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)
- o\_pd\_airic\_costae\_od Aggregated access/ egress costs in EUR from the regions to the airports generated by trips from European region to RoW region (returning trip costs are not included)
- o\_pd\_airic\_costnet\_od Aggregated net transport costs in EUR from the regions to the airports generated by trips from European region to RoW region (returning trip costs are not included)
- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)

#### Vehicle Stock

- i\_pd\_coef\_occupancy\_rate Occupancy rate by country, purpose and mode
- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode (returning trip pkm are not included)
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)

- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender

#### Environment

- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode (returning trip pkm are not included)
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender

## Safety

- o\_pd\_pkm\_transit\_safety Aggregated total passenger kilometres including transit by country, mode, simple age groups and gender
- o\_pd\_vkm\_transit- Aggregated total vkm including transit by country and mode
- o\_pd\_trips\_orig\_safety Aggregated trips by origin region, mode, simple age groups and gender cohort
- o\_pd\_urban\_pkm\_ctry Total urban passenger kilometres by country, urban mode, simple age group and gender
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender
- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)

# 3.2.5 Vehicle Stock

The Vehicle Stock model consists of three components. The component 'Economic Factors' and the component 'Fleet Characteristics' generate data for the component, 'Vehicle Stock, User Costs'. The latter component generates the vehicle stock in combination with the user costs. The vehicle stock generation is based on historic data reflecting the vehicle portfolios characteristics such as age, type, propulsion technology and size.

The computation of user costs is also based on historic information about mode specific energy consumption and vehicle costs under consideration of propulsion technologies. The natural dynamic of the model is ensured by considering the scrappage and sales trends for vehicles.

There are feedback loops within the modules Economy & Resources as well as Passenger and Freight Demand. Concerning the information flow to and from the Vehicle Stock module the following data items are exchanged.

# Exogenous input from Database:

- i\_vs\_cap\_rpcs\_mkt Average vehicle purchase price (incl. VAT) in EUR by country, mode,
   vehicle type and fuel
- i\_vs\_cap\_rpcs\_vat Average vehicle purchase VAT in EUR by country, mode, vehicle type and fuel
- i\_vs\_cap\_tech Average technology related additional cost in EUR by country, mode, vehicle type and fuel
- i\_vs\_cap\_subsidy Average state subsidy to buy (cleaner) vehicles in EUR by country, mode, vehicle type and fuel
- i\_vs\_scrap\_subs Average state subsidy to scrap old or high polluting vehicles in EUR by country, mode, vehicle type and fuel
- i\_vs\_cstiww Average inland waterways generalised costs in EUR per vkm by country, mode, vehicle type and fuel
- i\_vs\_fu\_ct Carbon tax in EUR per tonne CO<sub>2</sub> by country, mode and vehicle fuel
- i\_vs\_fu\_fuel\_resource\_toe Energy resource cost in EUR by country, mode, vehicle fuel
- i\_vs\_fu\_fuel\_vat Fuel value added tax (VAT) in percent by country, mode and vehicle fuel
- i\_vs\_fu\_exduty\_eur\_1000l Fuel excise duty data given in EUR per 1000 l by country, mode and vehicle fuel
- i\_vs\_fu\_exduty\_eur\_1000kg Fuel excise duty data given in EUR per tonne by country, mode and vehicle fuel
- i\_vs\_fu\_exduty\_eur\_gj Fuel excise duty data given in EUR per gigajoule fuel by country, mode and vehicle fuel
- i\_vs\_fu\_exduty\_eur\_kwh Fuel excise duty data given in EUR per kilowatt hour by country, mode and vehicle fuel
- i\_vs\_nf\_air\_neoe\_pas Non-energy related variable air passenger costs in EUR per tkm by mode, vehicle type and fuel

- i\_vs\_nf\_air\_neoe\_fre Non-energy related variable air freight costs in EUR per tkm by mode,
   vehicle type and fuel
- i\_vs\_nf\_mar\_chcost Annual cargo handling costs (loading, discharge, cargo claims) in EUR
   by mode, vehicle type and fuel
- i\_vs\_nf\_mar\_oi\_vcost Annual voyage costs (port and light dues, tugs and pilotage, canal dues) in EUR by mode, vehicle type and fuel
- i\_vs\_nf\_mar\_opcost Annual non-fuel related operational costs (daily manning, stores, routine repair and maintenance, insurance and administration) in EUR by mode, vehicle type and fuel
- i\_vs\_nf\_mar\_repmaintc Annual periodic maintenance costs (temporary dry-docking for regular and special surveys) in EUR by mode, vehicle type and fuel
- i\_vs\_nf\_rail\_crec Crew cost in EUR per hour by mode, vehicle type and fuel
- i\_vs\_nf\_rail\_damc Damage load cost in EUR per train by mode, vehicle type and fuel
- i\_vs\_nf\_rail\_othc Other costs in EUR per tkm by mode, vehicle type and fuel
- i\_vs\_nf\_rail\_repmaintc Repair and maintenance costs in EUR per vkm by mode, vehicle type and fuel
- i\_vs\_nf\_cstinsu Insurance costs in EUR per vkm by country, mode, vehicle type and fuel
- i\_vs\_nf\_road\_repmaintc Average repair and maintenance costs in EUR per vkm by country, mode vehicle type and fuel
- i\_vs\_nf\_rof\_cst\_labo Average labour costs in EUR per tkm by country, mode, vehicle type and fuel
- i\_vs\_nf\_rof\_cst\_othr Average other non-fuel operational costs in EUR per tkm by country,
   mode, vehicle type and fuel
- i\_vs\_nf\_rof\_cst\_time Average non-fuel operational time costs in EUR per tkm by country, mode, vehicle type and fuel
- i\_vs\_nf\_taxfuel Average additional fuel tax in EUR per tkm by country, mode,
   vehicle type and fuel
- i\_vs\_nf\_taxinsu Average insurance tax in EUR per tkm by country, mode, vehicle type and fuel
- i\_vs\_nf\_taxown Average ownership tax in EUR per tkm by country, mode,
   vehicle type and fuel
- i\_vs\_nf\_taxregs Average registration tax in EUR per tkm by country, mode, vehicle type and fuel

- i\_vs\_veh\_stock Input vehicle stock in thousands by country, mode, vehicle type and fuel
- i\_vs\_veh\_stock\_age Input vehicle stock by age in thousands by country, mode, vehicle type, fuel and technology (age cohort)
- p\_vs\_surv\_scrap Vehicle scrappage rate
- p\_vs\_surv\_depriv Vehicle deprivation rate
- p\_vs\_logit\_elast Vehicle type related elasticity for the logit model
- p\_vs\_fu\_emfactor: Emission factor as described in the EU Energy Tax Directive (ETD): minima of excise duty
- p\_vs\_fu\_nrg\_content Energy content of fuels
- p\_vs\_fu\_toe Tonnes of oil equivalent per litre of fuel
- p\_vs\_rail\_spec\_whour Total yearly working hours of rail vehicles by type

# Endogenous **input** from HIGH-TOOL core modules:

# Demography

 o\_de\_pop - Projected population by region (EU28 + CH + NO), age and gender cohort. RoW outputs prefilled from UN projections exogenously

## **Economy & Resources**

• o\_er\_gdp\_capita - GDP per capita per region

#### Freight Demand

- o\_fd\_vkm\_urban (for the final only, to be discussed) Freight mobility in an urban region by vehicle-kilometres
- o\_fd\_vkm\_od Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band
- p\_fd\_load\_factor Average load rate for freight transport in EUR per vkm (no differentiation by country)
- p\_fd\_load\_capacity Average load capacity for freight transport in EUR per vkm (no differentiation by country)

## Passenger Demand

- i\_pd\_coef\_occupancy\_rate Occupancy rate by country, purpose and mode
- o\_pd\_vkm\_od Aggregated vkm by origin/destination, region and mode (returning trip vkm are not included)

- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)
- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender

# **Output** to the Database:

- o\_vs\_cstavggen\_fix\_vkm Average generalised fixed cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_fix\_tkm Average generalised fixed cost in EUR per tonne kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_tkm Average generalised variable cost in EUR per tonne kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_fix\_pkm Average generalised fixed cost in EUR per passenger kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_pkm Average generalised variable cost in EUR per passenger kilometre by country, mode and fuel type
- o\_vs\_cstavgen\_cost Average generalised cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_fu\_fuel\_resource\_l Fuel resource cost in EUR per litre by country, mode and the concerned fuel type
- o\_vs\_fu\_fuel\_exduty Fuel excise duty in EUR per litre by country, mode and fuel type
- o\_vs\_fu\_fuel\_cost\_l Fuel costs in EUR per litre of fuel by country, mode and the concerned fuel type
- o\_vs\_fu\_fuel\_cost\_g Fuel costs in EUR per gram of fuel by country, mode and the concerned fuel type
- o\_vs\_fu\_fuel\_cost\_toe Fuel costs in EUR per tonne of oil equivalent of fuel by country, mode and the concerned fuel type
- o\_vs\_fu\_CO2\_tax CO<sub>2</sub> tax component in total fuel cost in EUR per 1000 l by country, mode and fuel type

- o\_vs\_tax\_revenues Generated tax revenues in EUR at country level
- o\_vs\_veh\_stock Detailed vehicle stock in vehicles by country, mode, fuel and vehicle type
- o\_vs\_veh\_stockage Vehicle stock in 1000 vehicles by country, mode, fuel type, vehicle type and vehicle technology (age cohort)
- o\_vs\_veh\_stock\_n2 Detailed Vehicle stock in vehicles by region (NUTS-2 level), mode, fuel and vehicle type
- o\_vs\_vkm Detailed generated vkm by country, vehicle type, mode and fuel type
- o\_vs\_vkm\_n2 Detailed generated vkm by region (NUTS-2 level), vehicle type, mode and fuel type
- o\_vs\_vkm\_iww Generated vkm IWW by country, mode, fuel type, IWW mode of appearance and IWW distance band
- o\_vs\_purch Total new vehicle purchase cost in EUR distinguished by modes at country (NUTS-0) level

# **Output** to other HIGH-TOOL core modules:

# **Energy & Resources**

- o\_vs\_tax\_revenues Generated tax revenues in EUR at country level
- o\_vs\_purch Total new vehicle purchase cost in EUR distinguished by modes at country (NUTS-0) level
- o\_vs\_cstavggen\_fix\_vkm Average generalised fixed cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_veh\_stock\_n2 Detailed Vehicle stock in vehicles by region (NUTS-2 level), mode, fuel and vehicle type
- o\_vs\_vkm\_n2 Detailed generated vkm by region (NUTS-2 level), vehicle type, mode and fuel type

#### Environment

- o\_vs\_veh\_stock Detailed vehicle stock in vehicles by country, mode, fuel and vehicle type
- o\_vs\_veh\_stock\_age Vehicle stock in 1000 vehicles by country, mode, fuel type, vehicle type
  and vehicle technology (age cohort)

- o\_vs\_vkm Detailed generated vkm by country, vehicle type, mode and fuel type
- o\_vs\_vkm\_iww Generated vkm IWW by country, mode, fuel type, IWW mode of appearance and IWW distance band

# Freight Demand

- o\_vs\_cstavggen\_fix\_tkm Average generalised fixed cost in EUR per tonne kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per tonne kilometre by country, mode and fuel type

# Passenger Demand

- o\_vs\_veh\_stock Detailed vehicle stock in vehicles by country, mode, fuel and vehicle type
- o\_vs\_cstavggen\_fix\_vkm Average generalised fixed cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_vkm Average generalised variable cost in EUR per vehicle kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_fix\_pkm Average generalised fixed cost in EUR per passenger kilometre by country, mode and fuel type
- o\_vs\_cstavggen\_var\_pkm Average generalised variable cost in EUR per passenger kilometre by country, mode and fuel type

## 3.2.6 Environment

The Environment module consists of three components. The component 'Technology' and the component 'Emission Factors' produce input for the component 'Emissions'. The core of the 'Emission' component is the calculation of emission indicators differentiated per vehicle, propulsion technology and energy consumption under consideration of the transport demand figures with vehicle stock attributes. The COPERT<sup>8</sup> method is used for the module to calculate the emissions.

There are no feedback loops seen with other modules. Concerning the information flow to and from the Environment module the following data items are exchanged.

<sup>&</sup>lt;sup>8</sup> COPERT is based on average speed while the VERSIT model is based on traffic situations (road types, speed limits, degrees of congestion). COPERT is more suitable then to be used on our high level tool while VERSIT is more suitable for network based model with more detailed network information. VERSIT is a discrete model to simulate the traffic emissions of CO<sub>2</sub>, NO<sub>x</sub> and PM on the basis of the instantaneous velocity and acceleration of a vehicle.

## Exogenous **input** from Database:

- i\_ev\_CO2\_content CO<sub>2</sub> content of fuel in tonnes CO<sub>2</sub> per 1000 l by country, mode and vehicle fuel
- i\_ev\_emfactor Fuel consumption and emission factors in grams of pollutant per vkm by mode, vehicle type, vehicle fuel and emission type
- i\_ev\_emindex Emission indexes in gram per kilogram of emission by vehicle type
- p\_ev\_int\_railpax Passenger rail fuel intensity
- p\_ev\_int\_railfreight Freight rail fuel intensity
- p\_ev\_int\_air Air transport fuel intensity
- p\_ev\_int\_mar Maritime transport fuel intensity
- p\_ev\_emindex\_non\_elef Carbon content of non-electricity based fuel
- p\_ev\_emindex\_elef Carbon content of electricity
- p\_ev\_air\_spec\_fden Air transport fuel density
- p\_ev\_air\_spec\_speed Air transport average speed
- p\_ev\_mar\_spec\_rate Maritime transport average freight yearly growth
- p\_ev\_mar\_spec\_avg\_dwt Maritime transport average dead weight tonnage

## Endogenous **input** from HIGH-TOOL core modules:

## Vehicle Stock

- o\_vs\_veh\_stock Detailed vehicle stock in vehicles by country, mode, fuel and vehicle type
- o\_vs\_veh\_stock\_age Vehicle stock in 1000 vehicles by country, mode, fuel type, vehicle type
  and vehicle technology (age cohort)
- o\_vs\_vkm Detailed generated vkm by country, vehicle type, mode and fuel type
- o\_vs\_vkm\_iww Generated vkm IWW by country, mode, fuel type, IWW mode of appearance and IWW distance band

## Freight Demand

o\_fd\_vkm\_od - Vehicle kilometres by origin/destination at NUTS-2 level per mode, commodity and distance band

## Passenger Demand

o\_pd\_vkm\_od - Aggregated vkm by origin/destination, region and mode (returning trip vkm are not included)

- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender
- o\_pd\_airic\_pkm\_od Aggregated passenger kilometres by origin/destination from European regions to RoW regions (returning trip pkm are not included)

## Output to the Database:

- o\_ev\_t\_co2 Tonnes of CO<sub>2</sub> emitted by country, mode, fuel und vehicle type
- o\_ev\_t\_fuel Tonnes of fuel consumed by country, mode, concerned fuel and vehicle type
- o\_ev\_t\_nox Tonnes of NO<sub>x</sub> emitted by country, mode, fuel and vehicle type
- o\_ev\_t\_pm Tonnes of Particulate Matters emitted
- o\_ev\_t\_so2 Tonnes of SO<sub>2</sub> emitted by country, mode, fuel and vehicle type

#### **Output** to other HIGH-TOOL core modules:

Besides the data interchange with the Database module there is no output delivered to other HIGH-TOOL core modules.

# **3.2.7 Safety**

The target of this module is to assess the impact of safety policy measures. Inputs are historic mobility (from data) and predicted mobility (from the HIGH-TOOL demand modules) and user input changes to safety risk and safety risk causal factors. Risk is defined as the number of "occurrences" (fatalities, injuries) per unit of mobility (kilometres driven). The calculation sequence is split into four components. The component 'Mobility & Crash Data' compiles the historic mobility and safety data (i.e. crash data) generating risk trend lines. This information is used by the component 'Base Risk'. Under consideration of the mobility predictions from the Passenger and Freight Demand modules a basic risk calculation is executed reflecting a business as usual (BAU) situation.

Subsequently the component 'Impact Risk' allows adaptation of the basic risk scenario according to the anticipated effect of modelled safety measures. This effect is derived from changes to accident causal factors (which are the policy inputs) and the elasticities and equations relating these to changes in risk (component 'Causal Variables'). Finally the 'Impact Risk' component executes safety predictions based on the changes defined by the user; thus, the impact risk scenario is generated. While for road, fatalities, serious and slight injuries are predicted, for the other modes the model focuses on fatalities. For all modes the social costs are calculated.

No feedback loops to other modules are expected. Concerning the information flow to and from the Safety module the following data items are exchanged.

Exogenous **input** from Database (stratification still under investigation):

- i\_sa\_fat\_bike Historic bike fatality data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_serinj\_bike Historic bike serious injury data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_slinj\_bike Historic bike slight injury data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_fat\_car Historic car fatality data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_serinj\_car Historic car serious injury data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_slinj\_car Historic car slight injury data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_fat\_p2w Historic P2W fatality data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_serinj\_p2w Historic P2W serious injury data per year for 2001–2010 by country,
   age group and gender cohort
- i\_sa\_slinj\_p2w Historic P2W slight injury data per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_fat\_ped Historic pedestrian fatality data per year for 2001–2010 by country and mode (urban, involved)
- i\_sa\_serinj\_ped Historic pedestrian serious injury data per year for 2001–2010 by country and mode (urban, involved)
- i\_sa\_slinj\_ped Historic pedestrian slight injury data per year for 2001–2010 by country and mode (urban, involved)
- i\_sa\_fat\_pt Historic public transport fatality data per year for 2001–2010 by country
- i\_sa\_serinj\_pt Historic public transport serious injury data per year for 2001–2010 by country
- i\_sa\_slinj\_pt Historic public transport slight injury data per year for 2001-2010 by country
- i sa fat truck Historic truck fatality data per year for 2001–2010 by country

- i\_sa\_serinj\_truck Historic truck serious injury data per year for 2001-2010 by country
- i\_sa\_slinj\_truck Historic truck slight injury data per year for 2001–2010 by country
- i\_sa\_fat\_air Current annual average number of fatalities for air for EU28 + CH + NO
- i\_sa\_fat\_rail Current annual average number of fatalities for rail by country
- i\_sa\_fat\_risk\_iww Policy level for fatality risk inland waterways (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_fat\_risk\_sss Policy level for fatality risk short sea shipping (in percentage change)
   compared to 2010 for EU28 + CH + NO
- i\_sa\_pkm\_bike Bike pkm 2010 by country, age group and gender cohort
- i\_sa\_pkm\_car Historic car pkm per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_pkm\_p2w Historic P2W pkm per year for 2001–2010 by country, age group and gender cohort
- i\_sa\_pkm\_pt Historic public transport person kilometres per year for 2001–2010 by country
- i\_sa\_engine\_failure\_air Policy level for air engine failure (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_crew\_error\_air Policy level for air crew errors (in percentage change)
   compared to 2010 for EU28 + CH + NO
- i\_sa\_tech\_failure\_air Policy level for air technical failure excl. engine (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_runway\_collision\_air Policy level for air runway collisions (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_fire\_air Policy level for air fire on board (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_mid\_air\_collision\_air Policy level for air mid-air collisions (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_load\_error\_air Policy level for air loading errors (in percentage change) compared to 2010 for EU28 + CH + NO
- i\_sa\_speed\_bike Policy level for bike speed (in percentage change) compared to 2010 by country
- i\_sa\_dui\_bike Policy level for bike driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country, age group and gender cohort

- i\_sa\_distraction\_bike Policy level for distraction of cyclists (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_fatigue\_bike Policy level for fatigue of cyclists (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_helmet\_bike Policy level for use of helmets by cyclists (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_infra\_fault\_bike Policy level for bike accidents caused by infrastructural faults (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_veh\_defect\_bike Policy level for bike vehicle defects (in percentage change) compared to 2010 by country
- i\_sa\_time\_med\_care\_bike Policy level for time to medical care after bike accident (in percentage change) compared to 2010 by country. In the expert mode you may change its values by age group and gender cohort
- i\_sa\_speed\_car Policy level for car speed (in percentage change) compared to 2010 by country
- i\_sa\_dui\_car Policy level for car driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country, by age group and gender cohort
- i\_sa\_distraction\_car Policy level for distraction of car drivers (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_fatigue\_car Policy level for fatigue of car drivers (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_restraint\_car Policy level for car driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country, by age group and gender cohort
- i\_sa\_infra\_fault\_car Policy level for car accidents caused by infrastructural faults (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_veh\_defect\_car Policy level for car vehicle defects (in percentage change) compared to 2010 by country
- i\_sa\_time\_med\_care\_car Policy level for time to medical care after car accident (in percentage change) compared to 2010 by country
- i\_sa\_speed\_p2w Policy level for P2W speed (in percentage change) compared to 2010 by country
- i\_sa\_dui\_p2w Policy level for P2W driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country, age group and gender cohort

- i\_sa\_distraction\_p2w Policy level for distraction of P2W drivers (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_fatigue\_p2w Policy level for fatigue of P2W drivers (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_helmet\_p2w Policy level for use of helmets by P2W drivers/passengers (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_infra\_fault\_p2w Policy level for P2W accidents caused by infrastructural faults (in percentage change) compared to 2010 by country, age group and gender cohort
- i\_sa\_veh\_defect\_p2w Policy level for P2W vehicle defects (in percentage change) compared to 2010 by country
- i\_sa\_time\_med\_care\_p2w Policy level for time to medical care after P2W accident (in percentage change) compared to 2010 by country
- i\_sa\_speed\_pt Policy level for public transport speed (in percentage change) compared to 2010 by country
- i\_sa\_dui\_pt Policy level for public transport driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country
- i\_sa\_distraction\_pt Policy level for distraction of public transport drivers (in percentage change) compared to 2010 by country
- i\_sa\_fatigue\_pt Policy level for fatigue of public transport drivers (in percentage change) compared to 2010 by country
- i\_sa\_infra\_fault\_pt Policy level for public transport accidents caused by infrastructural faults (in percentage change) compared to 2010 by country
- i\_sa\_veh\_defect\_pt Policy level for public transport vehicle defects (in percentage change) compared to 2010 by country
- i\_sa\_time\_med\_care\_pt Policy level for time to medical care after public transport accident (in percentage change) compared to 2010 by country
- i\_sa\_osign\_staff\_error\_rail Policy level for rail operating and signalling staff error (in percentage change) compared to 2010 by country
- i\_sa\_crew\_error\_rail Policy level for rail crew errors (in percentage change) compared to 2010 by country
- i\_sa\_track\_staff\_error\_rail Policy level for rail track staff error (in percentage change) compared to 2010 by country
- i\_sa\_stock\_fault\_rail Policy level for rail rolling stock fault (in percentage change) compared to 2010 by country

- i\_sa\_infra\_fault\_rail Policy level for rail accidents caused by infrastructural faults (in percentage change) compared to 2010 by country
- i\_sa\_lc\_veh\_acc\_rail Policy level for rail level-crossing accident vehicle (in percentage change) compared to 2010 by country
- i\_sa\_lc\_vuln\_acc\_rail Policy level for rail level-crossing accident vulnerable user (in percentage change) compared to 2010 by country
- i\_sa\_trespassing\_rail Policy level for rail trespassing accident (in percentage change) compared to 2010 by country
- i\_sa\_platform\_acc\_rail Policy level for rail platform accident (in percentage change) compared to 2010 by country
- i\_sa\_falling\_from\_train\_rail Policy level for rail falling from train (in percentage change) compared to 2010 by country
- i\_sa\_speed\_truck Policy level for truck speed (in percentage change) compared to 2010 by country
- i\_sa\_dui\_truck Policy level for truck driving under influence of alcohol/drugs (in percentage change) compared to 2010 by country
- i\_sa\_distraction\_truck Policy level for distraction of truck drivers (in percentage change) compared to 2010 by country
- i\_sa\_fatigue\_truck Policy level for fatigue of truck drivers (in percentage change) compared to 2010 by country
- i\_sa\_restraint\_truck Policy level for truck use of restraint devices (in percentage change) compared to 2010 by country
- i\_sa\_blind\_spot\_truck Policy level for truck blind spots (in percentage change) compared to 2010 by country
- i\_sa\_infra\_fault\_truck Policy level for truck accidents caused by infrastructural faults (in percentage change) compared to 2010 by country
- i\_sa\_veh\_defect\_truck Policy level for truck vehicle defects (in percentage change) compared to 2010 by country
- i\_sa\_time\_med\_care\_truck Policy level for time to medical care after truck accident (in percentage change) compared to 2010 by country
- i\_sa\_load\_error\_truck Policy level for truck accidents caused by infrastructural faults (in percentage change) compared to 2010 by country
- i\_sa\_trips\_air Current annual average mobility for air in trips for EU28 + CH + NO

- i\_sa\_vkm\_rail Current annual average mobility for rail in vehicle kilometres by country
- i\_sa\_vkm\_truck Historic truck vehicle kilometres per year for 2001–2010 by country
- i\_sa\_vkm\_urban Historic urban vehicle kilometres per year for 2001–2010 by country and mode (urban, involved)

# Endogenous input from HIGH-TOOL core modules:

# Freight Demand

 o\_fd\_vkm\_transit - Freight mobility in a country including transit in vehicle kilometres by country, distance band and mode

# Passenger Demand

- o\_pd\_pkm\_transit\_safety Aggregated total passenger kilometres including transit by country, mode, simple age groups and gender
- o\_pd\_vkm\_transit- Aggregated total vkm including transit by country and mode
- o\_pd\_trips\_orig\_safety Aggregated trips by origin region, mode, simple age groups and gender cohort
- o\_pd\_urban\_pkm\_ctry Total urban passenger kilometres by country, urban mode, simple age group and gender
- o\_pd\_urban\_vkm\_ctry Total urban vehicle kilometres by country, urban mode, simple age group and gender
- o\_pd\_airic\_trips\_od Aggregated passenger trips by origin/destination from European regions to RoW regions (returning trips are not included)

#### **Output** to the Database:

- o\_sa\_acc\_cost\_air Total social accident costs for air in 1000 EUR for EU28 + CH + NO
- o\_sa\_fat\_air\_pred Air fatalities for EU28 + CH + NO
- o\_sa\_fat\_bike\_pred Bike fatalities by country, age and gender cohort
- o\_sa\_serinj\_bike\_pred Bike serious injuries by country, age and gender cohort
- o sa slinj bike pred Bike slight injuries by country, age and gender cohort
- o\_sa\_fat\_car\_pred Car fatalities by country, age and gender cohort
- o\_sa\_serinj\_car\_pred Car serious injuries by country, age and gender cohort
- o\_sa\_slinj\_car\_pred Car slight injuries by country, age and gender cohort

- o\_sa\_acc\_cost\_iww Total social accident costs for inland waterway in 1000 EUR for EU28 + CH + NO
- o\_sa\_fat\_iww\_pred Inland waterway fatalities for EU28 + CH + NO
- o\_sa\_fat\_p2w\_pred P2W fatalities by country, age and gender cohort
- o\_sa\_serinj\_p2w\_pred P2W serious injuries by country, age and gender cohort
- o\_sa\_slinj\_p2w\_pred P2W slight injuries by country, age and gender cohort
- o\_sa\_fat\_ped\_pred Pedestrian fatalities by country and mode (urban, involved)
- o\_sa\_serinj\_ped\_pred Pedestrian serious injuries by country and mode (urban, involved)
- o\_sa\_slinj\_ped\_pred Predicted pedestrian slight injuries per year for 2010-2050
- o\_sa\_fat\_pt\_pred Public transport fatalities by country
- o\_sa\_serinj\_pt\_pred Public transport serious injuries by country
- o\_sa\_slinj\_pt\_pred Public transport slight injuries by country
- o\_sa\_acc\_cost\_rail Total social accident costs for rail in 1000 EUR by country
- o\_sa\_fat\_rail\_pred Rail fatalities by country
- o\_sa\_acc\_cost\_sss Total social accident costs for short-sea shipping in 1000 EUR for EU28 + CH + NO
- o\_sa\_fat\_sss\_pred Short-sea shipping fatalities for EU28 + CH + NO
- o\_sa\_fat\_truck\_pred Truck fatalities by country
- o\_sa\_serinj\_truck\_pred Truck serious injuries by country
- o\_sa\_slinj\_truck\_pred Truck slight injuries by country
- o\_sa\_costs\_road Total social accident costs for road transport in 1000 EUR by country and urban mode

# **Output** to other HIGH-TOOL core modules:

Besides the data interchange with the Database module there is no output delivered to other HIGH-TOOL core modules.

#### 3.2.8 Database

The Database module is the major information exchange entity for all in- and output data the HIGH-TOOL modules need to perform the computation. WP3 is specifically dedicated to the Database, and Deliverable D3.19 (Kiel et al., 2015) outlines in detail the data structure, dimensions and characteristics complemented by metadata. The Database underlies an intensive exchange of data with all modules.

Exogenous **input** for Database (see the dedicated sections of the HIGH-TOOL core modules above):

- Extract of the ETISplus database
- Eurostat and other public databases
- EU Reference Scenario 2013
- Scenario specifications by the user (including data uploads).

Endogenous **input** from HIGH-TOOL core modules is listed in the dedicated sections above but in general the following data are exchanged:

- Impedance and socio-economic data upload
- Policy request translation (scenario definition).

The specification of a TPM by the users is interpreted as a policy request addressed to HIGH-TOOL. Therefore the TPM specification needs to be translated to run the modules, i.e. the policy request is translated using policy levers (see chapter 4.1.1). For transparency reasons the policy request will also become part of the report attached to the assessment results.

All core modules deliver their intermediate and final data sets to the Database module. The Database provides **output** to other HIGH-TOOL core modules as listed in the previous sections above.

# 3.2.9 Assessment

The assessment report is produced by following three components: external cost computation as the welfare (changes in household income – monetised externalities, and employment) caused by transport, inter-modal competition analyses, and the technical report generator to transform the generated results into a user friendly document. The assessment report itself is an electronic document based on Excel which can be downloaded by the user.

<sup>&</sup>lt;sup>9</sup> D3.1 will be updated to D3.2.

All data produced by the core modules and stored in the Database are available for generation of the assessment reports. There is one feedback loop with the user interface and the Database. Concerning the information flow to and from the Assessment module the following data items are exchanged.

#### **Input** from Database:

All data according to the requested assessment report type will be withdrawn from the Database module. The indicators available are shown in Table 6 per module.

Table 6: Assessment variables of the HIGH-TOOL model

### Assessment variables of the HIGH-TOOL prototype

#### **General Features**

- » Geographical scope: EU28 + NO + CH on NUTS-0 and/or NUTS-2, RoW by country aggregation
- » Period: 2010–2050 in 5-year steps respectively yearly steps (as defined by the user)

#### Demography

o\_de\_labour, o\_de\_pop

#### **Economy & Resources**

```
o_er_gdp, o_er_gdp_capita, o_er_cons_capita, o_er_trade, o_er_labour_new, o_er_wage_new, o_er_return_new, o_er_gdp_new, o_er_income, o_er_PD_new, o_er_Pnew, o_er_trade_new, o_er_employment, o_er_income_capita, o_er_co2, o_er_sox, o_er_nox, o_er_PM, o_er_biomass, o_er_wood, o_er_metalores, o_er_water, o_er_minerals, o_er_fossilfuel, o_er_gva, o_er_hh_consumption, o_er_int_input, o_er_prod_tax, o_er_cap_returns, o_er_cap_stock, o_er_output, o_er_tot_emissions, o_er_wages, o_er_price_index, o_er_indirect_utility
```

#### **Vehicle Stock**

```
o_vs_cstavggen_fix_vkm, o_vs_cstavggen_var_vkm, o_vs_cstavggen_fix_tkm, o_vs_cstavggen_var_tkm, o_vs_cstavggen_fix_pkm, o_vs_cstavggen_var_pkm, o_vs_fu_fuel_resource_l, o_vs_fu_fuel_exduty, o_vs_fu_fuel_cost_l, o_vs_fu_fuel_cost_g, o_vs_fu_fuel_cost_toe, o_vs_fu_CO2_tax, o_vs_tax_revenues, o_vs_veh_stock, o_vs_veh_stock_age, o_vs_stock_n2, o_vs_fu_energy_tax, o_vs_vkm, o_vs_vkm_n2, o_vs_vkm_iww, o_vs_purch
```

#### **Environment**

```
o\_ev\_t\_co2, o\_ev\_t\_fuel, o\_ev\_t\_nox, o\_ev\_t\_pm, o\_ev\_t\_so2
```

## **Freight Demand**

 $o\_fd\_tkm\_od, o\_fd\_vkm\_od, o\_fd\_t\_od, o\_fd\_total\_cost\_od, o\_fd\_vkm\_transit, o\_fd\_tkm\_transit, o\_fd\_tk$ 

#### **Passenger Demand**

```
o_pd_od_fix_cost, o_pd_od_time_cost, o_pd_od_toll_cost, o_pd_od_var_cost, o_pd_orig_fix_cost, o_pd_orig_time_cost, o_pd_orig_toll_cost, o_pd_orig_var_cost, o_pd_transit_fix_cost, o_pd_transit_time_cost, o_pd_transit_toll_cost, o_pd_transit_var_cost, o_pd_pkm_orig, o_pd_pkm_transit, o_pd_vkm_od, o_pd_pkm_orig, o_pd_pkm_transit, o_pd_vkm_od, o_pd_trips_orig, o_pd_pkm_orig_safety, o_pd_pkm_transit_safety, o_pd_airic_trips_od, o_pd_airic_pkm_od, o_pd_airic_costae_od, o_pd_airic_costnet_od, o_pd_urban_pkm_ctry, o_pd_urban_trips_ctry, o_pd_urban_vkm_ctry, o_pd_vkmdistancebandctry, o_pd_pkmdistancebandctry
```

#### Safety

```
o_sa_acc_cost_air, o_sa_fat_air_pred, o_sa_fat_bike_pred, o_sa_serinj_bike_pred, o_sa_slinj_bike_pred, o_sa_fat_car_pred, o_sa_serinj_car_pred, o_sa_slinj_car_pred, o_sa_acc_cost_iww, o_sa_fat_iww_pred, o_sa_fat_p2w_pred, o_sa_serinj_p2w_pred, o_sa_slinj_p2w_pred, o_sa_fat_ped_pred, o_sa_serinj_ped_pred, o_sa_slinj_pt_pred, o_sa_acc_cost_rail, o_sa_fat_rail_pred, o_sa_acc_cost_sss, o_sa_fat_sss_pred, o_sa_fat_truck_pred, o_sa_serinj_truck_pred, o_sa_slinj_truck_pred, o_sa_costs_road
```

**Input** from HIGH-TOOL modules:

- Scenario definition provided by the interactive user interface
- Assessment report request by the user.

**Output** to the Database respectively the main hard disc of the computer and other HIGH-TOOL modules:

Assessment report (including the policy request addressed to the system) as Excel/Word file.

## 3.2.10 User Interface

The interface has four components which support the user in defining policy requests with an adequate assessment report type and to up-/download certain data sets such as impedances or socio-economic data and to document the policy request started. The fourth component will translate the users' policy request into module conforming language after the interactive entry of the users' scenario specification. For more details the reader is referred to Deliverable  $D6.1^{10}$  (Biosca et al., 2015) and its updated versions.

A feedback loop exists between the Assessment and the Database. Concerning the information flow to and from the User Interface module the following data items are exchanged.

# **Input** from Database:

- Data download
- Assessment report (including the policy request addressed to the system) download.

The reports provided will allow comparison of the results from the policy scenario with the ones of the reference scenario. While the reference scenario needs to reflect the defined EU Reference Scenario 2013 it might be necessary for the experienced user to allow for changes within a user defined scenario. Thus the option to work with other socio-economic and transport related data had been considered.

<sup>&</sup>lt;sup>10</sup> Deliverable D6.1 will be updated to Deliverable D6.2.

# **Output** to the Database:

- Impedance and socio-economic data upload
- Policy request translation (scenario definition including changes in causal variables resulting from modelled safety measure(s)).

A detailed description of the user interface is provided by D6.1 (Biosca et al., 2015).

# 3.2.11 Summary of the Input/Output Matrix

Figure 5 displays the data interdependencies within the HIGH-TOOL model as described in the previous chapters. The matrix allows an overview of where and what type of information is exchanged between the modules. It reflects the dataflow when considering that the data exchange passes through the database.

Module delivers data / information to	Demography	Economy & Resources	Vehide Stock	Environment
Demography		For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0, For EU28+NO+CH on NUTS-0 Rest of World bundles o_de_labour o_de_pop	For EU28+NO+CH on NUTS-0 o_de_pop	No input required
Economy & Resources	No input required		For EU28+NO+CH on NUTS-2 o_ef_gdp_capita	No input required
Vehide Stock	No input required	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0 o_vs_tax_revenues o_vs_purch o_vs_cstavggen_fix_vkm, o_vs_cstavggen_var_vkm, o_vs_veh_stock_n2, o_vs_vkm_n2		For EU28+NO+CH and Rest of Europe NUTS-0 o_vs_veh_stock o_vs_veh_stock_age o_vs_vkm o_vs_vkm
Environment	No input required	No input required	No input required	
Freight Demand	No input required	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0,  Rest of World bundles o_fd_tkm_od, o_fd_vkm_od, o_fd_total_cost i_fd_total_cost	For EU28-NO+CH on NUTS-2, Rest of Europe NUTS-0, Rest of World bundles o_fd_vkm_od p_fd_load_factor p_fd_load_capacity	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0 o_fd_vkm_od

Figure 5: Input/Output matrix of the HIGH-TOOL model

Module delivers data / information to	Freight Demand	Paccenger Demand	vidis	Database
Demography	No input required	Europe NUTS-	No input required	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0, Rest of World bundles  o_de_labour  o_de_pop
Economy & Resources	For EU28+NO-FCH on NUTS-2, Rest of Europe NUTS-0, Rest of World bundles o_er_trade_new	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-10. Rest of World bundles o_er_gdp o_er_empl o_er_income	No input required	For EU28-NO+CH on NUTS-2, Rest of Europe NUTS-0, Rest of World bundles  o_er_gdp_o_er_gdp_capita, o_er_cons_capita, o_er_labour_new, o_er_wage_new, o_er_return_new, o_er_income, o_er_PD_new, o_er_Pnew, o_er_trade_new, o_er_mox_o_er_PM_o_er_lincome_capita, o_er_co2, o_er_sox, o_er_mox_o_er_PM_o_er_binmass, o_er_wood, o_er_mox_o_er_PM_o_er_binmass, o_er_wood, o_er_metal_ores, o_er_water, o_er_minerals, o_er_fossilfuel, o_er_gro_d_ax_o_er_cap_feturns, o_er_en_stock, o_er_output, o_er_tot_emissions, o_er_wages, o_er_price_index, o_er_indirect_utility, o_er_value
Vehicle Stock	For EU28+NO+CH on NUTS-0, Rest of Europe NUTS-0 o_vs_cstavggen_jrix_tkm o_vs_cstavggen_jvar_ykm	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0 No input required o_vs_veh_stock For EU28+NO+CH on NUTS-0, Rest of Europe NUTS-0 o_vs_cstavggen_fix_vkm o_vs_cstavggen_var_vkm o_vs_cstavggen_var_vkm (non road modes) o_vs_cstavggen_var_pkm (non road modes)	No input required	For EU284NO+CH on NUTS 2, Rest of Europe NUTS 0  o_vs_cstavggen_fiv_wkm  o_vs_cstavggen_yar_wkm  o_vs_cstavggen_yar_tkm  o_vs_cstavggen_yar_tkm  o_vs_cstavggen_var_tkm  o_vs_cstavggen_var_pkm  o_vs_cstavggen_var_pkm  o_vs_cstavggen_var_pkm  o_vs_cstavggen_var_pkm  o_vs_fu_fuel_cost g_o_vs_fu_fuel_cost_l  o_vs_fu_fuel_cost g_o_vs_fu_fuel_cost_l  o_vs_fu_fuel_cost g_o_vs_fu_fuel_cost_l  o_vs_fu_fuel_cost g_o_vs_fu_fuel_cost_l  o_vs_fu_fuel_cost g_o_vs_fu_fuel_cost_l  o_vs_fu_fuel_cost_g_o_vs_fw_fax_revenues  o_vs_tuel_stock, o_vs_vkm, o_vs_vkm_invv  o_vs_purch
Environment	No input required	No input required	No input required	For EU28+NO+CH on NUTS 2  o_ev_t_co2, o_ev_t_fuel  o_ev_t_nox, o_ev_t_pm  o_ev_t_so2
Freight Demand		No input required	For EU28HNO+CH on NUTS-O o_fd_vkm_transit	For EU28+NO+CH on NUTS 2, Rest of Europe NUTS 0, Rest of World bundles  o_fo_tkm_od, o_fo_vkm_od, o_fo_t_od, o_fo_total_cost_od  o_fo_air_demand_od_t, o_fd_air_demand_od_tkm  o_fo_air_demand_od_vkm, o_fo_air_demand_t_od  For EU28+NO+CH on NUTS 0  o_fo_vkm_transit, o_fd_tkm_transit

Figure 6: Input/Output matrix of the HIGH-TOOL model

Vehide Stock Environment	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0  o_pd_vkm_od (air not covered)  i_pd_coef_occupancy_rate  For O/D relations from (to) EU28+NO+CH on NUTS-2  For O/D relations from (to) EU28+NO+CH on NUTS-2  o_pd_airic_pkm_od  o_pd_airic_pkm_od  For EU28+NO+CH on NUTS-0  o_pd_urban_vkm_ctry  for EU28+NO+CH on NUTS-0  o_pd_urban_vkm_ctry	No input required	For EU28+NO+CH on NUTS-2, Rest of Europe NUTS-0  i.vs.cap_rots_amkt, i.vs.rots_vat i.vs.cap_rots_amkt, i.vs.rots_vat i.vs.cap_rots_amkt, i.vs.rots_vat i.vs.cap_rots_amkt, i.vs.rots_vat i.vs.cap_subs, i.vs.sap_subsidy i.vs.cap_subs, i.vs.sap_subsidy i.vs.cap_subs, i.vs.sap_subsidy i.vs.fu_ti.los_
Vehic	For EU28+NO+CH on NUTS-2, Re o_pd_vkm_od (air not covered) i_pd_coef_occupancy_rate For O/D relations from (to) EU2 (from) Rest of World bundles o_pd_airic_trips_od o_pd_airic_trips_od i_pd_airic_trips_od c_pd_airic_trips_od c_pd_airic_trips_od c_pd_airic_trips_od i_pd_airic_trips_od	No input required	i.vs_cap_rpcs_mkt_i_vs_prest of Europe NUTS i.vs_cap_rpcs_mkt_i_vs_pres_vat i.vs_cap_rpcs_mkt_i_vs_pres_vat i.vs_cap_rpcs_mkt_i_vs_pres_vat i.vs_cap_subs_i_vs_castww i.vs_fu_ct, i_vs_fu_fue _resource_loe i.vs_fu_ct, i_vs_fu_fue _resource_loe i.vs_fu_ct, i_vs_fu_fue _resource_loe i.vs_fu_evduty_eur_lo00kg, i_vs_fu_exduty_eur. i.vs_fu_evduty_eur_lo00kg, i_vs_fu_exduty_eur. i.vs_fu_exduty_eur_lo00kg, i_vs_fu_exduty_eur. i.vs_fu_ene_offe_i_vs_fu_eni_n=opcost i.vs_fu_ene_offe_i_vs_fu_eni_n=opcost i.vs_fu_en_of_looner_i_vs_fu_eni_offe i.vs_fu_en_offe_offe_offe_offe_offe_offe_offe_o
Economy & Resources	For EUZ8+NO+CH on NUTS-2, Rest of Europe NUTS-0 o_pd_ukm_od o_pd_wkm_od o_pd_wkm_od o_pd_wkm_od o_pd_disps_od o_pd_disps_od o_pd_disps_od o_pd_dod_iss_od o_pd_dod_iss_od o_pd_dod_iss_od o_pd_dod_iss_od o_pd_od_iss_od	No input required	For EUZ8+NO+CH on NUTS-2, Rest of Europe NUTS-0,  Rest of World bundles  p.er_glapa_i.bt p.er_glap  p.er_glapa_i.bt p.er_glap  p.er_glapa_i.bt p.er_glap  p.er_glapa_i.bt p.er_glapa_i.bt p.er_glapa_i.bt.p.er_glapa_i.
Demography	No input required	No input required	For EUZ8-NO-CH on NUTS-2, Rest of Europe NUTS-0, Rest of World bundles i.de_labour_hist i.de_labour_hist i.de_labour_perc i.de_deabh i.de_pop_disag i.de_pop_eurostat i.de_life_men i.de_life_men i.de_life_monen i.de_life_monen i.de_life_trate i.de_life_trate i.de_life_trate i.de_life_trate i.de_tret_frate i.de_life_trate i.de_eurban i.de_eurban i.de_eurban i.de_eurf
Module delivers data / information to	Passenger Demand	Safety	Database

Figure 5: Input/Output matrix of the HIGH-TOOL model (cont.)

Module delivers data / information to	Freight Demand	Passenger Demand	Safety	Database
Passenger Demand	No input required		For EU28+NO-CH on NUTS-2 o_pd_bfm_transit_gafety o_pd_trips_orig  For EU28+NO-CH on NUTS-0 o_pd_urban_ukm_ctry For cy/D relations from (to) Rest of World bundles o_pd_airic_trips_od	For EUZ8-MO-CH on NUTS-2, Rest of Europe NUTS-0 a bud_od_fiv_cost, a bud_od_time_cost, a_pd_od_tuol_cost, a_pd_oring_fiv_cost, a_pd_od_time_cost, bud_oring_fiv_cost, a_pd_oring_time_cost, a_pd_oring_fiv_cost, a_pd_oring_time_cost, a_pd_oring_fiv_cost, a_pd_oring_time_cost, a_pd_transit_fiv_cost, a_pd_oring_time_cost, a_pd_transit_fiv_cost, a_pd_oring_time_cost, a_pd_transit_fiv_cost, a_pd_oring_time_cost, a_pd_transit_fiv_cost, a_pd_fiv_aransit_fiva_cost, a_pd_transit_fiv_cost, a_pd_fiva_roing_to_pd_fiva_transit_s a_pd_trips_od_o_pd_fiv_fiv_soring_to_pd_fiva_transit_safety a_pd_timp_oring_fiv_fiv_pd_fiva_transit_safety a_pd_imp_aenet_dist, a_pd_fiva_transit_safety a_pd_imp_aenet_dist, a_pd_imp_hnet_time For O/D relations from (to) EUZ8+NO+CH on NUTS-2 to (from) for a_int_trips_sod_o_pd_aint_costnet_od a_pd_int_trips_sod_o_pd_aint_costnet_od a_pd_urban_pkm_ctry, a_pd_urban_trips_ctry, a_pd_urban_pkm_ctry, a_pd_urban_trips_ctry, a_pd_wkmdistancebandctry, a_pd_wkmdistancebandctry
Safety	No input required	No input required		For EUZ8+NO+CH on NUTS 0  9.4.3 exc.cost ladi, 0.5.9 lat lar pred  9.5.3 fat blike pred, 0.5.9 serini_bike_pred,  9.5.3 fini_bike_pred  9.5.3 fini_bike_pred,  9.5.3 fini_ar_pred  9.5.3 fini_ar_pred  9.5.3 fini_ar_pred  9.5.3 fini_bike_pred,  9.5.3 fini_bike_pred  9.5.3 fini_bike_pred
Database	For EUZBANO-CH on NUTS-2, Rest of Europe NUTS-0, Rest of Varied bundles Lid region, share, i ful imp dist Lid region, share, i ful imp dist Lid soute, choice, but ful for each of the Loss i ful ful cost i ful ful cost but district to ful ful cost but district put ful ful cost put district put ful ful cost put district put ful mer, put district put district put ful mer, put district district put district d	for EU28-NO+CH on NUTS-2, Rest of Europe NUTS-	for EUZBHOHCH on NUTSO Lisa fat bitk Lisa_stini_bitk Lisa_sterini_bitkisa_stini_bitk Lisa_sterini_botkisa_stini_bitk Lisa_sterini_botkisa_stini_pot Lisa_sterini_botkisa_stini_botkisa_stini_pot Lisa_sterini_botkisa_stini_botkisa_stini_pot Lisa_sterini_botkisa_stini_botkisa_stini_botkisa_sterini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_stini_botkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkbotkisa_botkbotkisa_botk_	

Figure 5: Input/Output matrix of the HIGH-TOOL model (cont.)

# 4 Transport Policy Measures (TPMs)

HIGH-TOOL is designed as strategic tool to assess Transport Policy Measures. To offer the user a wide spectrum of possibilities three options to define Transport Policy Measures are available (see Biosca et al., 2015):

- Single Transport Policy Measure
   Policies have been extracted from publications of the European Commission along the user requirements outlined at the beginning of the HIGH-TOOL project (Vanherle et al., 2014).
- Policy package with combined Transport Policy Measures
   This option allows the used to combine TPMs in a consistent way for simulation of more complex policy packages by merging TPMs.
- User defined Policy Scenarios
   The user is free to develop a customised TPM by selecting policy levers used in HIGH-TOOL.

The following chapters reflect the transport policy measures the HIGH-TOOL model addresses, what type of policy levers are used, and which TPMs are already embedded in the EU Reference Scenario 2013.

# 4.1 Transport Policy Measures Addressed in HIGH-TOOL

In total four categories of transport policy measures (TPMs) are envisaged. The categories reflect the ones mentioned in the White Paper. There are six transport policy measures dealing with pricing category, five with research and innovation, eight with efficiency standards and flanking measures, and eleven with internal market. In total 30 pre-defined transport policy measures can be investigated which are distributed among four policy categories as displayed in Figure 6.

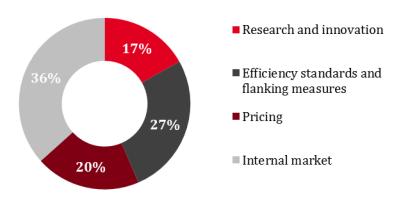


Figure 7: Transport Policy Measures by category

To address the full scope of each transport policy measure different HIGH-TOOL modules need to handle the investigation. Thus three times the Economy & Resources module is directly approached, 14 times the Passenger Demand, 25 times the Freight Demand, 35 times the Vehicle Stock, nine times the Environment and 12 times the Safety module. As direct approach we define a modification of a policy lever which is assigned to a specific HIGH-TOOL module as the policy investigated changes directly the input values. As several feedback loops exist and the modules interact respectively one module produces input to another one, there are also indirect effects.

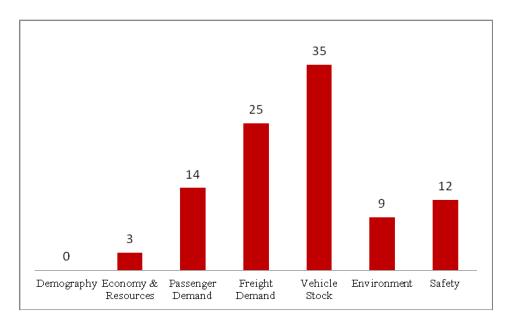


Figure 8: Transport Policy Measures by modules

# 4.2 Transport Policy Measures and Policy Levers

Condensing the scope of EU policy priorities presented in chapter 2 and referring to the results of surveys among future tool users of the European Commission (see Vanherle et al. 2014), following key focal points of transport policy had been identified: policies related to the GHG emissions reduction target; improving road safety and accomplishing the internal market. Thus, the Transport Policy Measures in the core of the tool are organised along four policy categories as shown in Table 7: efficiency standards and flanking measures, pricing, research and innovation, as well as internal market. Some of the policy measures fit to more than one policy category while in the table just one is listed.

Table 7: Transport Policy Measures addressed in HIGH-TOOL

Category	Single Transport Policy Measures addressed in HIGH-TOOL
Efficiency standards and	Improving local public transport
flanking measures	Deployment of efficient vehicles
	Replacement of inefficient LDVs and buses
	HDV limitation for urban areas
	LDV speed limit
	Diffusion of H <sub>2</sub> fuel cell cars
	Diffusion of electro cars
	Replacement of inefficient cars
Pricing	CO <sub>2</sub> feebates for road transport
	CO <sub>2</sub> certificate system for road transport
	Circulation tax for cars
	Internalisation of external costs
	HDV infrastructure change
	Urban road charging
Research and innovation	Intelligent road vehicles
	Dynamic traffic management for road
	Intelligent traffic information system for road
	Road vehicle safety technology protecting other transport users
	Safety systems for road vehicle users
Internal market	Acceleration of TEN-T implementation
	River information system
	European Rail Traffic Management System
	Harmonised handling of dangerous goods
	Harmonisation of rail safety
	Harmonised social rules for truck drivers
	Opening the internal IWW market
	Enhance service quality at ports
	Maritime traffic management system
	Freight corridor management
	Single rail vehicle authorisation and certification

The 30 policy measures are spread across all modes and a variety of policy topics. As the discussion about most policy measures is still ongoing the tool allows the user to use three dimensions to define a policy scenario for a policy assessment. The policy lever may vary

- in its value within a pre-defined interval preventing the user from abusing the system,
- the time horizon starting in the year 2010 to 2050 (by 5 year steps), and
- the geographic scope (at NUTS-0, 1 and 2 level).

The policy levers to translate the TPMs to the HIGH-TOOL model are manifold whereby some are specific for a policy while others are used in several TPMs. In Figure 8 the policy levers used for each TPM are displayed. The structure of the name of the policy lever contains information about the type (i = input, p = parameter), the module (pd = Passenger Demand, fd = Freight Demand, vs = Vehicle Stock, er = Energy & Resources, sa = Safety, ev = Environment), and the type of characteristic concerned.

Transport Policy Measure	Modules						
	Economy &	(					
Policy Name	▼ Resources	Passenger Demand	<ul> <li>Freight Demand</li> <li>Vehicle Stock</li> </ul>		<ul> <li>Environment</li> <li>Safety</li> </ul>	Safety	•
Urban road charging		i_pd_urban_dutoll	p_fd_load_factor				
Urban road charging			b_fd_speed				
Urban road charging			p_fd_toll_cost				
HDV infrastructure charge			p_fd_load_factor	i_vs_nf_rof_cst_othr			
HDV infrastructure charge			i_fd_toll_cost				
Internalisation of external costs		i pd core toll cost	i fd_toll_cost	i vs_nf_taxfuel			
Circulation tax for cars				i_vs_nf_rof_cst_othr			
Single European Sky		i_pd_link_time_weight		i_vs_nf_air_neoe_pas		i_sa_runway_collision_air	
Single European Sky		i_pd_imp_delta_los		i_vs_nf_air_neoe_fre		i_sa_mid-air_collision_air	
Safety systems for road vehicle users				i_vs_nf_cstinsu		i_sa_speed_truck, car, p2w, pt	
Safety systems for road vehicle users						i_sa_dui_truck, car, p2w, pt	
Safety systems for road vehicle users						i_sa_distraction_truck, car, p2w, pt	
Safety systems for road vehicle users						i_sa_fatigue_truck, car, p2w, pt	
Safety systems for road vehicle users						i_sa_restraint_truck, car	
Safety systems for road vehicle users						i_sa_time_med_care_truck, car, p2w, pt	
Safety systems for road vehicle users						i_sa_veh_defect_truck, car, p2w, pt	
Road vehicle safety technology							
protecting other transport users				i_vs_cap_rpcs_mkt		i_sa_blind_spot_truck	
Road vehicle safety technology							
protecting other transport users				i_vs_cap_tech		i_sa_speed_p2w, bike	
Road vehicle safety technology							
protecting other transport users						i_sa_distraction_p2w, bike	
Road vehicle safety technology							
protecting other transport users						i_sa_fatigue_p2w, bike	
Road vehicle safety technology							
protecting other transport users						i_sa_veh_defect_p2w, bike	
Road vehicle safety technology							
protecting other transport users						i_sa_helmet_bike	
Improvement of energy efficiency of vehicles				i_vs_cap_rpcs_mkt	i_ev_emfactor		
Improvement of energy efficiency of vehicles				i vs cap tech			
Improvement of energy efficiency of							
venicies							

Figure 9: Pre-defined transport policy measures and their policy levers

Transport Policy Measure	Modules					
	Economy &	▼ Passenger Demand	▼ Freight Demand ▼ Vehicle Stock	Vehicle Stock	▼ Environment ▼ Safety	Safety
New fuels and propulsion systems				i_vs_veh_stock	i_ev_emfactor	
New fuels and propulsion systems				i_vs_cap_rpcs_mkt		
New fuels and propulsion systems				i_vs_cap_tech		
European Rail Traffic Management						
System		i_pd_link_time_weight	p_fd_speed	i_vs_cap_rpcs_mkt		i_sa_osign_staff_error_rail
European Rail Traffic Management						
System		i_pd_imp_delta_los		i_vs_nf_rail_othc		i_sa_crew_error_rail
European Rail Traffic Management						
System						i_sa_track_staff_error_rail
River information system			p_fd_wait_time	i_vs_cstiww		
River information system			p_fd_load_time			
River information system			p_fd_unload_time			
River information system			p_fd_fixed_cost			
River information system			p_fd_var_cost			
Intelligent traffic information system						
for road		i_pd_link_time_weight	p_fd_speed	i_vs_cap_tech		
Intelligent traffic information system						
for road		i_pd_imp_delta_los				
Intelligent traffic information system						
for road		i_pd_link_time_weight	b_fd_speed	i_vs_cap_tech		
Intelligent traffic information system						
for road		i_pd_imp_delta_los				
Intelligent traffic information system						
for road		i_pd_link_time_weight	p_fd_speed	i_vs_cap_tech		i_sa_speed_truck, car, p2w, pt, bike
Intelligent traffic information system						
for road		i_pd_imp_delta_los				i_sa_time_med_care_truck, car, p2w, pt, bike
Replacement of inefficient cars				i_vs_veh_stock	i_ev_emfactor	
Replacement of inefficient cars				i_vs_cap_rpcs_mkt		
Replacement of inefficient cars				i_vs_cap_tech		
Diffusion of electro cars				i_vs_veh_stock	i_ev_emfactor	
Diffusion of electro cars				i_vs_cap_rpcs_mkt		
Diffusion of electro cars				i_vs_cap_tech		
Diffusion of H2 fuel cell cars				i_vs_veh_stock	i_ev_emfactor	
Diffusion of H2 fuel cell cars				i_vs_cap_rpcs_mkt		
Diffusion of H2 fuel cell cars				i_vs_cap_tech		

Figure 8: Pre-defined transport policy measures and their policy levers (cont.)

Transport Policy Measure	Modules					
	Economy &					
Policy Name	<ul> <li>Resources</li> </ul>	<ul> <li>Passenger Demand</li> </ul>	Freight Demand  Vehicle Stock	Vehicle Stock	<ul><li>Environment</li><li>Safety</li></ul>	Safety
Deployment of efficient vehicles	i_er_invest_rtd	P.	p_fd_load_factor	i_vs_veh_stock	i_ev_emfactor	i_sa_speed_truck, car, p2w, pt, bike
Deployment of efficient vehicles			p_fd_speed	i_vs_cap_rpcs_mkt		i_sa_dui_truck, car, p2w, pt, bike
Deployment of efficient vehicles			p_fd_load_capacity i_vs_cap_tech	i_vs_cap_tech		i_sa_distraction_truck, car, p2w, pt, bike
Deployment of efficient vehicles						i_sa_fatigue_truck, car, p2w, pt, bike
Deployment of efficient vehicles						i_sa_restraint_truck, car
Deployment of efficient vehicles						i_sa_blind_spot_truck
Deployment of efficient vehicles						i_sa_veh_defect_truck, car, p2w, pt, bike
Deployment of efficient vehicles						i_sa_load_error_air
Deployment of efficient vehicles						i_sa_crew_error_rail, air
Deployment of efficient vehicles						i_sa_stock_fault_rail
Deployment of efficient vehicles						i_sa_engine_failure_air
Deployment of efficient vehicles						i_sa_tech_failure_air
Deployment of efficient vehicles						i_sa_runway_collision_air
Deployment of efficient vehicles						i_sa_fire_air
Deployment of efficient vehicles						i_sa_mid-air_collision_air
Deployment of efficient vehicles						i_sa_fat_risk_iww, sss
CO2 certificate system for road				i_vs_fu_exduty_eur_1000l	1000	
CO2 feebates for road transport				i_vs_veh_stock		
CO2 feebates for road transport				i_vs_cap_rpcs_mkt		
CO2 feebates for road transport				i_vs_cap_tech		
CO2 feebates for road transport				i_vs_nf_rof_cst_othr		
Harmonisation of rail safety		i_pd_link_time_weight	p_fd_wait_time	i_vs_cap_rpcs_mkt		i_sa_osign_staff_error_rail
Harmonisation of rail safety		i_pd_imp_delta_los		i_vs_nf_rail_othc		i_sa_crew_error_rail
Harmonisation of rail safety						i_sa_track_staff_error_rail
Harmonisation of rail safety						i_sa_stock_fault_rail
Harmonisation of rail safety						i_sa_infra_fault_rail
Harmonisation of rail safety						i_sa_lc_veh_acc_rail
Harmonisation of rail safety						i_sa_lc_vuln_acc_rail
Harmonisation of rail safety						i_sa_trespassing_rail
Harmonisation of rail safety						i_sa_platform_acc_rail
Harmonisation of rail safety						i_sa_falling_from_train_rail

Figure 8: Pre-defined transport policy measures and their policy levers (cont.)

Transport Policy Measure	Modules						
	Economy &						
Policy Name	▼ Resources	<ul> <li>Passenger Demand</li> </ul>	Freight Demand 🔻 Vehicle Stock	Vehicle Stock	<ul><li>Environment</li><li>Safety</li></ul>	Safety	•
Harmonized handling of dangerous			p_fd_wait_time	i_vs_nf_rof_cst_othr		i_sa_load_error_truck	
Harmonized handling of dangerous			p_fd_load_time			i_sa_stock_fault_rail	
Harmonized handling of dangerous			p_fd_unload_time			i_sa_fat_risk_sss	
Harmonized handling of dangerous						i_sa_fat_risk_iww	
CO2 emissions limits for road vehicles	S			i_vs_cap_rpcs_mkt	i_ev_emfactor		
CO2 emissions limits for road vehicles	Sa			i_vs_cap_tech			
Pollutant limits for road vehicles				i_vs_cap_rpcs_mkt	i_ev_emfactor		
Pollutant limits for road vehicles				i_vs_cap_tech			
LDV speed limit			b_fd_speed			i_sa_speed_truck	
LDV speed limit			i_fd_imp_dist				
Opening the internal rail market		i_pd_ae_time_weight	p_fd_wait_time	i_vs_nf_rail_othc			
Opening the internal rail market		i_pd_imp_delta_los					
Single rail vehicle authorisation and							
certification		i_pd_link_time_weight	p_fd_wait_time	i_vs_cap_rpcs_mkt			
Single rail vehicle authorisation and							
certification		i_pd_imp_delta_los		i_vs_cap_tech			
Single rail vehicle authorisation and							
certification				i vs nf rail othc			
Freight corridor management			p_fd_wait_time	i_vs_nf_rail_othc			
Freight corridor management			p_fd_load_time				
Freight corridor management			p_fd_unload_time				
Freight corridor management			p_fd_load_factor				
Access to rail infrastructure		i_pd_ae_time_weight	p_fd_wait_time	i_vs_nf_rail_othc			
Access to rail infrastructure		i_pd_imp_delta_los					
Enhance sercice quality at airports		i_pd_ae_time_weight	p_fd_wait_time	i_vs_nf_air_neoe_pas			
Enhance sercice quality at airports		i_pd_imp_delta_los	p_fd_load_time	i_vs_nf_air_neoe_fre			
Enhance sercice quality at airports			p_fd_unload_time				
Enhance sercice quality at airports			b_fd_speed				

Figure 8: Pre-defined transport policy measures and their policy levers (cont.)

Transport Policy Measure	Modules						
	Economy &						
Policy Name	▼ Resources	<ul> <li>Passenger Demand</li> </ul>	Freight Demand Vehicle Stock	Vehicle Stock	<ul><li>Environment</li><li>Safety</li></ul>	Safety	<b>F</b>
Maritime traffic management system			p_fd_wait_time			i_sa_fat_risk_sss	
Maritime traffic management system			p_fd_load_time				
Maritime traffic management system			p_fd_unload_time				
Maritime traffic management system			p_fd_fixed_cost				
Enhance sercice quality at ports			p_fd_load_time	i_vs_nf_mar_opcost			
Enhance sercice quality at ports			p_fd_unload_time				
Enhance sercice quality at ports			p_fd_wait_time				
Opening the internal IWW market			p_fd_fixed_cost	i_vs_cstiww		i_sa_fat_risk_iww	
Opening the internal IWW market			p_fd_wait_time				
Single European road market			p_fd_load_factor	i_vs_nf_rof_cst_othr			
Harmonized social rules for truck			b_fd_speed	i_vs_nf_rof_cst_labo		i_sa_speed_truck	
Harmonized social rules for truck						i_sa_fatigue_truck	
	i_er_delta_inf						
Accelaration of TEN-T implementation inv	n inv	i_pd_link_time_weight	b_fd_speed	i_vs_nf_rof_cst_othr			
Accelaration of TEN-T implementation		i pd link dist weight	p fd wait time				
•			1				
Accelaration of TEN-T implementation	_	i_pd_core_toll_cost	p_fd_load_time				
Accelaration of TEN-T implementation	u		p_fd_unload_time				
Improving local public transport		i_pd_urban_dutraveltime					
Improving local public transport		i_pd_urban_duaetime					
Improving local public transport		i_pd_urban_dutraveldist	st				
HDV limitation for urban areas			p_fd_load_factor	i_vs_nf_rof_cst_othr			
Replacement of inefficient LDVs and							
buses	i_er_delta_inv		p_fd_load_factor	p_fd_load_factor i_vs_cap_rpcs_mkt	i_ev_emfactor		
Replacement of inefficient LDVs and							
buses			p_fd_load_capacity i_vs_cap_tech	i_vs_cap_tech			

Figure 8: Pre-defined transport policy measures and their policy levers (cont.)

For the implementation of a customised TPM, the following policy levers are made available to the user:

Module 💌	Policy lever name	Description
er	i_er_delta_inf_inv	Investments in infrastructure by region
er	i_er_delta_inv	Investment into fixed capital formation
er	i er delta pd costs	Change in automotive sector production costs due to innovations
er	i er delta rtd	Investments in RTD by region
er	p er beta	CobbDouglas utility parameter
er	p er delta	Depreciation rate
er	p er epsilon	Elasticity parameter of accessibility
er	p er phi	Savingsrate
ev	i ev co2 content	CO2 content of fuel in tons CO2 per 1000l by country, mode and vehicle fuel
		Fuel consumption and emission factors in grams of pollutant per vehicle kilometer by
ev	i ev emfactor	mode, vehicle type, vehicle fuel and emission type
ev	i ev emindex	Emission indexes in gram per kilogramm emission by vehicle type
		Distance impedances in kilometres by O/D at NUTS-2 level per distance band and
fd	i fd imp dist	mode
fd	i_fd_toll_cost	Average toll cost in euros/vkm by country and mode
fd	p fd air share full freight	Share of freight transported by passenger flights
fd	p fd fixed cost	Average fixed costs
fd	p_fd_fuel_cost	Average energy costs
fd	p fd load capacity	Average load capacity
fd	p fd load factor	Average load rate
fd	p fd load time	Average loading time
fd	p fd speed	Average speed
fd	p fd trade value	Commodity value in EUR (2010 constant prices)
fd	p fd unload time	Average unloading
fd	p fd var cost	Average variable costs
fd	p fd wait time	Average waiting time
		Policy weight to influence access/ egress travel distance to network by region and
pd	i_pd_ae_dist_weight	mode
pd	i_pd_ae_time_weight	Policy weight to influence access/ egress travel time to network by region and mode
pd	i_pd_core_toll_cost	Average toll costs per vehicle kilometre in euros by country and mode
in al	; ad care travaltimaleval	Level of travel time in relation to reference year by mode and country (travel time
pd	i_pd_core_traveltimelevel	improvement i.e. level < 1.0)
pd	i_pd_link_dist_weight	Policy weight to influence travel distance on link by mode
pd	i_pd_link_time_weight	Policy weight to influence travel time on link by mode
	:	Specific utility parameter referring to differences in access/ egress time between
pd	i_pd_urban_duaetime	reference year and forecast year  Specific utility parameter referring to differences in urban road charging between
pd	i_pd_urban_dutoll	reference year and forecast year
-		Specific utility parameter referring to differences in travel distance between
pd	i pd urban dutraveldist	reference year and forecast year
μ		Specific utility parameter referring to differences in travel time between reference
pd	i pd urban dutraveltime	year and forecast year
		1-2-2-2-1-2-1-2-1-2-1-2-1-2-1-2-1-2-1-2

Figure 10: Policy levers for customised transport policy measures

Module <b>▼</b>	Policy lever name	Description
sa	i_sa_blind_spot_truck	Truck blind spots (in percentage change) compared to 2010 by country
sa	i_sa_crew_error_air	Air crew error (in percentage change) compared to 2010 by country
sa	i_sa_crew_error_rail	Rail crew error (in percentage change) compared to 2010 by country
		Bike distraction (in percentage change) compared to 2010 by country, agegroup and
sa	i sa distraction bike	gender cohort
		Car distraction (in percentage change) compared to 2010 by country, agegroup and
sa	i sa distraction car	gender cohort
		P2w distraction (in percentage change) compared to 2010 by country, agegroup and
sa	i_sa_distraction_p2w	gender cohort
sa	i sa distraction pt	Public transport distraction (in percentage change) compared to 2010 by country
sa	i_sa_distraction_truck	Truck distraction (in percentage change) compared to 2010 by country
		Bike driving under influence (in percentage change) compared to 2010 by country,
sa	i_sa_dui_bike	agegroup and gender cohort
		Car driving under influence (in percentage change) compared to 2010 by country,
sa	i_sa_dui_car	agegroup and gender cohort
		P2w driving under influence (in percentage change) compared to 2010 by country,
sa	i_sa_dui_p2w	agegroup and gender cohort
		Public transport driving under influence (in percentage change) compared to 2010 by
sa	i sa dui pt	country
sa	i sa dui truck	Truck driving under influence (in percentage change) compared to 2010 by country
sa	i sa engine failure air	Air engine failure (in percentage change) compared to 2010 by country
sa	i_sa_falling_from_train_rail	Rail falling from train (in percentage change) compared to 2010 by country
sa	i_sa_fat_risk_iww	Fatality risk inland waterways (in percentage change) compared to 2010 by country
sa	i_sa_fat_risk_sss	Fatality risk short sea shipping (in percentage change) compared to 2010 by country
		Bike fatigue (in percentage change) compared to 2010 by country, agegroup and
sa	i sa fatigue bike	gender cohort
		Car fatigue (in percentage change) compared to 2010 by country, agegroup and
sa	i_sa_fatigue_car	gender cohort
	0 _	P2w fatigue (in percentage change) compared to 2010 by country, agegroup and
sa	i_sa_fatigue_p2w	gender cohort
sa	i sa fatigue pt	Public transport fatigue (in percentage change) compared to 2010 by country
sa	i sa fatigue truck	Truck fatigue (in percentage change) compared to 2010 by country
sa	i sa fire air	Air fire on board (in percentage change) compared to 2010 by country
		Bike use of helmets (in percentage change) compared to 2010 by country, agegroup
sa	i sa helmet bike	and gender cohort
		P2w use of helmets (in percentage change) compared to 2010 by country, agegroup
sa	i sa helmet p2w	and gender cohort
	,	Bike infrastructural faults (in percentage change) compared to 2010 by country,
sa	i_sa_infra_fault_bike	agegroup and gender cohort
		Car infrastructural faults (in percentage change) compared to 2010 by country,
sa	i_sa_infra_fault_car	agegroup and gender cohort
-		P2w infrastructural faults (in percentage change) compared to 2010 by country,
sa	i sa infra fault p2w	agegroup and gender cohort
		Public transport infrastructural faults (in percentage change) compared to 2010 by
sa	i_sa_infra_fault_pt	country
sa	i_sa_infra_fault_rail	Rail infrastructural fault (in percentage change) compared to 2010 by country
sa	i_sa_infra_fault_truck	Truck infrastructural faults (in percentage change) compared to 2010 by country

Figure 9: Policy levers for customised transport policy measures (cont.)

Module 🔻	Policy lever name	Description
	,	Rail level-crossing accident vehicle (in percentage change) compared to 2010 by
sa	i sa lc veh acc rail	country
		Rail level-crossing accident vulnerable user (in percentage change) compared to 2010
sa	i_sa_lc_vuln_acc_rail	by country
sa	i sa load error air	Air weight/balance errors (in percentage change) compared to 2010 by country
sa	i_sa_load_error_truck	Truck loading error (in percentage change) compared to 2010 by country
sa	i_sa_mid_air_collision_air	Air mid-air collisions (in percentage change) compared to 2010 by country
		Rail operating and signalling staff error (in percentage change) compared to 2010 by
sa	i sa osign staff error rail	country
sa	i_sa_platform_acc_rail	Rail platform accident (in percentage change) compared to 2010 by country
		Car use of restraint devices (in percentage change) compared to 2010 by country,
sa	i sa restraint car	agegroup and gender cohort
sa	i sa restraint truck	Truck use of restraint devices (in percentage change) compared to 2010 by country
sa	i_sa_runway_collision_air	Air runway collisions (in percentage change) compared to 2010 by country
		Bike speed (in percentage change) compared to 2010 by country, agegroup and
sa	i_sa_speed_bike	gender cohort
		Car speed (in percentage change) compared to 2010 by country, agegroup and gender
sa	i sa speed car	cohort
50	i_sa_speca_cai	P2w speed (in percentage change) compared to 2010 by country, agegroup and
sa	i_sa_speed_p2w	gender cohort
sa	i_sa_speed_pt	Public transport speed (in percentage change) compared to 2010 by country
sa	i_sa_speed_truck	Truck speed (in percentage change) compared to 2010 by country
sa	i_sa_stock_fault_rail	Rail rolling stock fault (in percentage change) compared to 2010 by country
30	I_3a_5tock_ladit_lali	nam ronning stock raute (in percentage change) compared to 2010 by country
sa	i sa tech failure air	Air technical failure excl. engine (in percentage change) compared to 2010 by country
30	1_3a_tecil_idildie_dil	Bike time to medical care (in percentage change) compared to 2010 by country,
sa	i_sa_time_med_care_bike	agegroup and gender cohort
3a	1_3a_time_med_care_bike	Car time to medical care (in percentage change) compared to 2010 by country,
sa	i_sa_time_med_care_car	agegroup and gender cohort
3 <b>a</b>	i_sa_time_med_care_car	P2w time to medical care (in percentage change) compared to 2010 by country,
sa	i_sa_time_med_care_p2w	agegroup and gender cohort
30	1_3a_time_med_care_pzw	Public transport time to medical care (in percentage change) compared to 2010 by
sa	i_sa_time_med_care_pt	country
sa	i sa time med care truck	Truck time to medical care (in percentage change) compared to 2010 by country
sa	i sa track staff error rail	Rail track staff error (in percentage change) compared to 2010 by country
sa	i_sa_track_stant_enor_ran	Rail trespassing accident (in percentage change) compared to 2010 by country
3a	I_sa_trespassing_tail	Bike vehicle defects (in percentage change) compared to 2010 by country, agegroup
sa	i_sa_veh_defect_bike	and gender cohort
3a	I_3a_veii_delect_bike	Car vehicle defects (in percentage change) compared to 2010 by country, agegroup
53	i_sa_veh_defect_car	and gender cohort
sa	I_3a_veii_delect_cal	P2w vehicle defects (in percentage change) compared to 2010 by country, agegroup
50	i sa veh defect p2w	and gender cohort
sa	i_sa_veii_delect_pzw	and gender condit
50	i sa yoh dofest st	Public transport vehicle defects (in percentage change) compared to 2010 by country
sa	i_sa_veh_defect_pt	
sa	i_sa_veh_defect_truck	Truck vehicle defects (in percentage change) compared to 2010 by country
	i us oon ross	Average road vehicle purchase price (with VAT) in euros per vehicle by country,
VS	i_vs_cap_rpcs_mkt	mode, vehicle type and fuel
		Average road vehicle purchase VAT in euros per vehicle by country, mode, vehicle
VS	i_vs_cap_rpcs_vat	type and fuel
		Average state subsidy to scarp old car in euros per vehicle by country, mode, vehicle
VS	i_vs_cap_scrap_subs	type and fuel
		Average state subsidy to buy cleaner car in euros per vehicle by country, mode,
VS	i_vs_cap_subsidy	vehicle type and fuel
		Technology related additional capital cost in euros per vehicle by country, mode,
VS	i_vs_cap_tech	vehicle type and fuel
		Inland water ways costs in euros per vehicle kilometer by country, mode and vehicle
VS	i_vs_cstiww	fuel

Figure 9: Policy levers for customised transport policy measures (cont.)

Module 🔻	Policy lever name	Description
VS	i_vs_fu_ct	Carbon tax in euros per tonne CO2 by country, mode and vehicle fuel
VS	i vs fu exduty eur 1000kg	Fuel excise duty data in euros per tonne by country, mode and vehicle fuel
VS	i_vs_fu_exduty_eur_1000l	Fuel excise duty data in euros per 1000l by country, mode and vehicle fuel
VS	i_vs_fu_exduty_eur_gj	Fuel excise duty data in euros per giga joule fuel by country, mode and vehicle fuel
VS	i vs fu exduty eur kwh	Fuel excise duty data in euros per kilo watt hour by country, mode and vehicle fuel
VS	i vs fu fuel resource toe	Fuel resource cost in euros per toe by country, mode and vehicle fuel
VS	i_vs_fu_vat_eur_1000kg	Fuel value added tax (VAT) in euros per tonne by country, mode and vehicle fuel
VS	i vs fu vat eur 1000l	Fuel value added tax (VAT) in euros per 1000 l by country, mode and vehicle fuel
VS	i vs fu vat eur gj	Fuel value added tax (VAT) for fuel types in eur per GJ
VS	i_vs_fu_vat_eur_kwh	Fuel value added tax (VAT) in euro per kilo watt hour
		Non energy related variable freight air transport costs in euros per tonne kilometer
VS	i_vs_nf_air_neoe_fre	by mode, vehicle type and fuel
		Non energy related variable passenger air transport costs in euros per passenger
VS	i vs nf air neoe pas	kilometer by mode, vehicle type and fuel
		Insurance costs for road transport in euros per vehicle kilometer by country, mode,
VS	i vs nf cstinsu	vehicle type and fuel
		Cargo handling cost for maritime transport in euros per vehicle by mode, vehicle type
VS	i_vs_nf_mar_chcost	and fuel
	1_12_111_11161_0110020	Voyage cost for maritime transport in euros per vehicle by mode, vehicle type and
VS	i_vs_nf_mar_oi_vcost	fuel
• • •	1_v3_iii_iiidi_0i_v0030	Non fuel operational cost for maritime transport in euros per vehicle by mode,
VS	i vs nf mar opcost	vehicle type and fuel
• • • • • • • • • • • • • • • • • • • •	1_v3_iii_iiiai_opeose	Repair and maintenance costs of maritime vehicles in euros per vehicle by mode,
VS	i_vs_nf_mar_repmaintc	vehicle type and fuel
• • • • • • • • • • • • • • • • • • • •	i_vs_m_mar_repmante	Crew costs of road and rail public transport in euros per hour by mode, vehicle type
VS	i vs nf rail crec	and fuel
• • •	1_13_111_1411_6166	Damage load cost for road and rail public transport in euros per vehicle day by mode,
VS	i_vs_nf_rail_damc	vehicle type and fuel
• • •	1_13_111_1411_441116	Other costs for road and rail public transport in euros per tonne kilometer by mode,
VS	i_vs_nf_rail_othc	vehicle type and fuel
	1_12_111_1411_41114	Repair and maintenance costs of rail vehicles in euros per vehicle kilometer by mode,
VS	i_vs_nf_rail_repmaintc	vehicle type and fuel
• • •	_vs_m_ram_repmanic	Repair and maintenance costs of road vehicles in euros per vehicle kilometer by
VS	i_vs_nf_road_repmaintc	country, mode, vehicle type and fuel
• • •	rs_m_rodd_repmante	Labour cost for freight road transport in euros per tonne kilometer by country, mode,
VS	i vs nf rof cst labo	vehicle type and fuel
	1_12_111_101_021_1020	Other non-fuel operational costs for freight road transport in euros per tonne
VS	i_vs_nf_rof_cst_othr	kilometer by country, mode, vehicle type and fuel
• • •	1_v3_iii_ioi_esc_otiii	Non fuel operational time cost for road transport in euros per tonne kilometer by
VS	i_vs_nf_rof_cst_time	country, mode, vehicle type and fuel
• • •	1_13_111_101_031_111110	Additional fuel tax for freight road transport in euros per tonne kilometer by country,
VS	i_vs_nf_taxfuel	mode, vehicle type and fuel
	1_12_111_tdx1'dc1	Insurance tax for road transport in euros per tonne kilometer by country, mode,
VS	i_vs_nf_taxinsu	vehicle type and fuel
		Ownership tax for road transport in euros per tonne kilometer by country, mode,
VS	i_vs_nf_taxown	vehicle type and fuel
		Registration tax for road transport in euros per tonne kilometer by country, mode,
VS	i_vs_nf_taxregs	vehicle type and fuel
VS	i_vs_veh_stock	Input vehicle stock in thousands by country, mode, vehicle type and fuel
	5_*en_5666	Emission factor as described in the EU Energy Tax Directive (ETD): minima of excise
VS	p_vs_fu_emfactor	duty
VS VS	p_vs_fu_enflactor p_vs_fu_nrg_content	Energy content of fuel
VS VS	p_vs_rail_spec_whour	Working hours per year for rail
V D	h_va_ran_ahec_willoni	Working hours per year for rail

Figure 9: Policy levers for customised transport policy measures (cont.)

#### 4.3 Description of the Single Transport Policy Measures

This chapter is dedicated to the description of the transport policy measures. To allow for a standardised comparison of the TPMs, a template has been used to structure the content. The template to describe a transport policy is split into three sections. The first one, section A, concentrates on the formal matters to assign a transport policy to its area and category according to the source, the White Paper. In addition the TPM is described and the main targets are listed.

Section B is dedicated to the principle influence of the policy measure on transport performance and quality, economy and resources as well as on safety and environmental issues. Arrows classify the influence as strong or marginal increase/decrease and in the case of no influence is expected as unrelated. Both sections of transport, passenger and freight, are treated separately as some TPMs are of constrained influence.

The third section C is the most important one for the translation of a transport policy measure into policy levers. Here it is marked whether one of the HIGH-TOOL modules is affected directly and the specific variable affected is depicted. In fact a transport policy is mapped upon variables of a module so that it is made transparent how and where a scenario input of a user will influence the HIGH-TOOL model. As the policy measures can be complex, more than one lever of one module as well as several levers of multiple modules can be addressed.

Throughout all sections of the template comment boxes allows for explanations such as interpretation hints or limitations. Figure 10 displays the template describing a transport policy measure in a standardised way.

																	_				
Section		C	Policy name																		
A		1	Policy Area																		
		2	Policy Category																		
		3	Policy Subcategory																		
		4	Transport Policy Measure																		
		L.	Main Toursto																		
			Main Targets																		
		6	White Paper Reference																		
В						Dose	senger						Freight								
				Rail	Road (Urban)	2	1	Public Transport	Slow	Rail	Road (Urban)	ĉ	Air	wwi	Short Sea	Maritime					
		7	Volume [passenger/tons]				1					<u> </u>									
	Indirect Traffic Impacts	_	Transport performance [vkm]						1								1				
	<u> </u>	_	Transport performance [pkm/tkm]						1		1						1				
		_	Travel time [min]		1			1	+	1	1			1	$\vdash$	+					
	1		Travel distance [km]		$\vdash$			1	+	1	1			1		1	1				
	-		Out of pocket costs [EUR/vkm]		├			1	+	1	1			<del>                                     </del>	1	1	1				
		_			<u> </u>	1		1	-	1	1			<u> </u>	<u> </u>	1					
	ect acts	_	Other cost components [EUR/vkm]																		
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)																Sectora	1	
		15	Comments														Overall	Aggricultural	Industrial	Transport	Other
		16	Economic growth [gdp]															Ì			
		17	Employment [#employed]																		
	<del>.</del>	18	Resources: Energy																		
	omic acts	19	Resources: Material																		
	Direct Economical Impacts	20	Other					•													
		21	Comments																		
		22	Safety [#accidents/vkm, #fatalities/vkm]																		
	ರ್ಡಿ	23	Other				-			1		-		'							
	Direct Social Impacts	24	Comments																		
		20	GHG emissions [g/vkm]		1		1	1	1	1	1	1	l	ı	ı						
		_	(Local) air pollution [g/vkm]																		
	豆		Other					ļ									1				
	Direct Environmental Impacts		Comments																		
	TPM translation			<b>Demography</b>	Economy & Resources	Passenger	eight nand	Vehicle Stock	Environment	Safety											
С	ıtranı			Demo	Econ	Pass	Fre	Vel	Enviro	Sa											
	Ę	29	HT Modules addressed by TPM								1										
	s		Demography		•	•															
	TPM policy levers		Economy & Resources								1										
	icy le		Passenger Demand Freight Demand								1										
	ilod		Vehicle Stock								1										
	Ψ	35	Environment																		
			Safety																		
			Comments References								1										
											1										
		48	Performed by	1							1										

Figure 11: Transport Policy Measure template

Based on the template outlined the 30 pre-defined transport policy measures addressed by HIGH-TOOL are shown in the Annex, part 1.1.

# 4.4 Transport Policy Measures Embedded in the EU Reference Scenario 2013

As the HIGH-TOOL model is calibrated to reflect the EU Reference Scenario 2013 certain transport policies are already assumed to be implemented up to the time horizon 2050. Thereof five TPMs concern the internal market category while two TPMs are assigned to each of the two categories 'efficiency standards and flanking measures' as well as 'research and innovation'. The transport policies concerned are:

- Opening the internal rail market
  - Open the domestic rail passengers market to competition, including mandatory award of public service contracts under competitive tendering. Open the domestic rail passengers market to competition to improve the attractiveness, competitiveness and service quality of passenger railway transportation (see Community railway liberalisation SEC(2004)236, COM(2004)139). The policy is set to simulate the EU open competition between rail passenger operators and the availability of an integrated Europe-wide railway network, assuming an impact on travel time and costs of passenger transport.
- Access to rail infrastructure
   Ensure effective and non-discriminatory access to rail infrastructure, including rail-related services, in particular through structural separation between infrastructure management and service provision. The policy is set to enhance competition in the rail market.
- Single European Sky
   Deployment of next generation of air traffic management system (SESAR) in the agreed time frame. Enable the Single European Sky, i.e. tripling air space capacity in Europe, increase safety in air transport by a power of ten, decrease emissions of air transport by 10%, and decrease applying ATM costs by at least 50%.
- Enhance service quality at airports

  Clarify and improve conditions to enter and provide quality services, including groundhandling while ensuring that all actors in an airport system meet minimum quality standards. The policy is set to enable access to airport infrastructure at a fair price to airlines, to
  improve aviation security checks at airports for the benefit of passengers and other stakeholders. Furthermore the policy shall encourage investments, especially through the use of
  innovative financial instruments, so as to steer growth, secure cohesion within the EU and
  enhance its economic, societal and cultural links with the rest of the world.

- Single European road market
   Elimination of market restrictions on road transport to establish a single European road
   transport market by eliminating the restrictions on cabotage, and thus full liberalisation.
- Improvement of energy efficiency of vehicles
   Technological innovation on vehicle efficiency through new engines, materials and design.
   Further improvement of energy efficiency of all vehicles to decrease energy demand and to reduce CO<sub>2</sub>-emissions.
- New fuels and propulsion systems
   Technological innovation on new fuels and propulsion systems to achieve cleaner energy use for all modes of passenger and freight transport. Increase adoption of next generation biofuels and the penetration of electric vehicles and other propulsion systems (CNG, LPG, ...).
- CO<sub>2</sub> emissions limits for road vehicles
   The policy is set to simulate restrictive limits on CO<sub>2</sub> emissions from new vehicles (cars and trucks). The activation of this measure corresponds to improved fuel efficiency of new vehicles purchased. The reduced fuel consumption results in reduced CO<sub>2</sub> emissions from new vehicles.
- Pollutant limits for road vehicles

  Standards for controlling air pollution (CO, NO<sub>x</sub>, particulate matter). The policy is set to simulate restrictive limits on pollutant emissions from new vehicles (cars and trucks). The activation of this measure corresponds to improved pollutant emission factors (for CO, NO<sub>x</sub>, particulate matter) related to the emission standards after EUR VI (EUR VII and more).

Based on the template outlined in the previous chapter the nine transport policy measures already embedded in the EU Reference Scenario 2013 are documented in the Annex, part 1.2.

The user has to keep in mind that any interpretation of assessment results are based on the assumption that the aforementioned nine TPMs which are already active throughout the whole time horizon up to 2050. They can neither be modified nor switched off as they are implemented as fixed policy measures according to the definition of the EU Reference Scenario 2013. As rule of thumb a continuous implementation of the policies had been assumed.

In this context it has to be pointed out that the implementation of the TEN-T infrastructure projects is as well assumed to be part of the EU Reference Scenario 2013 whereby the core network is planned to be completed by 2030 and the comprehensive one by 2050. HIGH-TOOL allows for an acceleration policy which shifts the final implementation towards earlier years. If this TPM is activated, the implementation of the Core TEN-T Network is assumed to be completed by the year 2025 instead of 2030, and the Comprehensive TEN-T Network by the year 2040 instead of 2050.

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Vanherle K., Corthout R., Szimba E., Meyer C., Kiel J., Ulied A., Biosca O., Török R. (2014): User Requirements, HIGH-TOOL Deliverable D1.1, project co-funded by the European Commission under the 7th Framework Programme, Karlsruhe.

#### **6** Other Project Resources

- ETISplus (European Transport Policy Information System Development and Implementation of Data Collection Methodology for EU Transport Modelling): <a href="http://www.transport-research.info/web/projects/project\_details.cfm?id=41679">http://www.transport-research.info/web/projects/project\_details.cfm?id=41679</a>.
- EXIOBASE (Global, detailed Multi-regional Environmentally Extended Supply and Use/Input Output database): <a href="http://exiobase.eu/component/content/?view=featured">http://exiobase.eu/component/content/?view=featured</a>.
- EXIOMOD (Regional economic model for advanced trade & transport scenario analysis on a national, regional and global scale): <a href="http://www.polfree.eu/publications/documents/EXIOMOD">http://www.polfree.eu/publications/documents/EXIOMOD</a>.
- EXIOPOL (Environmental accounting framework using externality data and input-output tools for policy analysis.): <a href="http://www.feem-project.net/exiopol/">http://www.feem-project.net/exiopol/</a>.
- HIGH-TOOL (Strategic high-level transport model): <a href="http://www.high-tool.eu">http://www.high-tool.eu</a>.
- RAEM (Spatial CGE model and explicitly considers interregional transportation and labour flows): <a href="http://www.tmleuven.be/project/raem/home.htm">http://www.tmleuven.be/project/raem/home.htm</a>.
- RHOMOLO (Regional holistic model): <a href="http://www.tmleuven.be/project/rhomolo/home.htm">http://www.tmleuven.be/project/rhomolo/home.htm</a>.
- TRANSTOOLS (Tools for Transport Forecasting and Scenario Testing): <a href="http://www.transport-research.info/web/projects/project\_details.cfm?ID=11088">http://www.transport-research.info/web/projects/project\_details.cfm?ID=11088</a>.
- TTv3 (Research and development of the European Transport Network Model, TRANSTOOLS Version 3): <a href="http://www.transport-research.info/web/projects/project\_details.cfm?id=41354">http://www.transport-research.info/web/projects/project\_details.cfm?id=41354</a>.
- VERSIT (Discrete model to simulate the traffic emissions of CO<sub>2</sub>, NO<sub>x</sub> and PM on the basis of the instantaneous velocity and acceleration of a vehicle): <a href="http://www.delftdimensions.nl/versit.aspx">http://www.delftdimensions.nl/versit.aspx</a>.

# HIGH

**Deliverable D2.2 Annex** 

Final Structure of HIGH-TOOL Model

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## **1** Transport Policy Measure Template Tables

#### **1.1 Pre-Defined TPM Templates**

#### 1.1.1 General Template

			J											-	-	-		1				
Section			Policy name															1				
A			Policy Area															ļ				
		2	Policy Category																			
		3	Policy Subcategory																			
		4	Transport Policy Measure																			
		5	Main Targets																			
		6	White Paper Reference																			
В		H				Pas	senge	er						Freight				1				
				Rail	Road (Urban)	_	vic distriction of the state of		Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)		Iww	Short Sea	Maritime					
	# u #	7	Volume [passenger/tons]				_															
	Indirect Traffic Impacts	8	Transport performance [vkm]																			
	3 - 5	9	Transport performance [pkm/tkm]			1																
			Travel time [min]		1	1	+	$\dashv$		<u> </u>	1	1						1				
			Travel distance [km]		1	$\vdash$	+	+			1	1						-				
		_	* *			1	+	+		-	1			-		-		1				
			Out of pocket costs [EUR/vkm]		ļ			_			<u> </u>	_						1				
	ಕ ಚಿಕ		Other cost components [EUR/vkm]																			
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)																	Sectora	ı	
		15	Comments															Overall	Aggricultural	Industrial	Transport	Other
		16	Economic growth [gdp]																`			
			Employment [#employed]																			
	<u>8</u>	18	Resources: Energy																			
	Direct Economical Impacts	19	Resources: Material																			
		20	Other																			
		21	Comments																			
		22	Safety [#accidents/vkm, #fatalities/vkm]																			
	t = €	23	Other								!						-	i				
	Direct Social Impacts		Comments																			
		25	GHG emissions [g/vkm]															1				
		26	(Local) air pollution [g/vkm]			t												1				
	ct nental icts	27	Other		-								!		-		-					
	Direct Environmental Impacts	28	Comments																			
С	TPM translation	20	NT Modulor addressed by TDM	<b>Demography</b>	Economy & Resources	Passenger	Freight	Demand	Vehide Stock	Environment	Safety											
	F		HT Modules addressed by TPM			<u> </u>					<u> </u>	1										
	ñ		Demography Economy & Poscursos									1										
	TPM policy levers		Economy & Resources Passenger Demand									1										
	licy		Freight Demand									1										
	log		Vehicle Stock									1										
	I PM	35	Environment																			
			Safety																			
			Comments	ļ								4										
			References																			
		48	Performed by	1				_		_		1										

### 1.1.2 Single Rail Vehicle Authorisation and Certification (2)

Section		0	Policy name	Single	rail veh	nicle au	thorisat	ion and	certifi	cation							l				
A		1	Policy Area		rnal mai																
		2	Policy Category		al mark																
		3	Policy Subcategory Transport Policy Measure		tail - int ve a sins			type au	thorisa	tion an	d a sing	le raily	av und	ertaking	safety						
			,		cation b										,,						
		5	Main Targets								ure Eur	opean i	ailway	saftey h	armoni	sation.					
		6	White Paper Reference		efficient Single Ei					em											
					ive 1: A					ervices											
В						Pass	enger						Freigh	ıt							
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				Rail	Road (Urban)	Road n-Urb	Air	Public Transport	Slow	Rail	Road (Urban)	Road P-1 lrh	Α̈́	N.	Short Sea	Maritime					
					" ⊇	Road (Non-Urban)		T P	ω ≥		" 2	Road (Non-Hrhan)		-	Sho	Σª					
		7	Volume [passenger/tons]	n		0				1		-		0							
	Indirect Traffic Impacts		Transport performance [vkm]	7		2				7		2		2							
	<u> </u>	9	Transport performance [pkm/tkm]	7		0				7		2		2							
		10	Travel time [min]	2		73				2		73		70							
			Travel distance [km]	73						73											
		_	Out of pocket costs [EUR/vkm]																		
			Other cost components [EUR/vkm]	_								1									
	Direct Traffic Impacts			9			<u> </u>			<i>9</i>	ļ	_		1	L				Sectora		
	를 로 를	14	Qualitative effects (e.g. liability,)		tnis me poly inh									is nam	ered by	/ tne			Sectora		
		15	Comments	_									_	me savi	ngs on c	ross		<u>la</u>	_	+	
				borde	r rail se	rvices. I	But a ha	rmonisa	ation of						y stand		ara	Aggricultural	Industrial	Transport	Other Services
				leads t	to (mon	nentary	) increa	se of co	sts.								Overall	ggria	inpu	Lans	Ott
		10	Economic growth [gdp]														<u> </u>				
			Employment [#employed]									-					⇒	⇒	⇒	1	⇒
	Direct Economical Impacts		Resources: Energy														<b>→</b>	<b></b>	⇒	1	→
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	_ 8 =	20																			
		21																			
	+ - B	22	Safety [#accidents/vkm, #fatalities/vkm]	⇒						⇒											
	Direct Social Impacts	23	Other									-									
		24	Comments																		
	enta	25	GHG emissions [g/vkm]																		
	Direct Environmenta I Impacts	26																			
	ء ق ہ	27																			
	ш	28	Comments																		
	5			γ	og √	<b>5.</b> -			ir												
	atic			<b>Demography</b>	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
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С	TPM translation	20	HT Modules addressed by TPM		<u> </u>	-	,	,													
	-		:	Χ	Χ	✓	✓	<b>√</b>	Χ	X											
			Demography Economy & Resources	n/a																	
		31		n/a																	
	2		Passenger Demand	n/a i_pd_l	ink_tim	ie_weig	ht,														
	evers			i_pd_l	ink_tim mp_del			fservice	<u>-</u> )	'											
	licy levers	32	Passenger Demand Freight Demand	i_pd_l i_pd_i p_fd_v	mp_del wait_tin	lta_los ( ne	level o														
	A policy levers	32	Passenger Demand	i_pd_l i_pd_i p_fd_v i_vs_c	mp_del wait_tin ap_rpcs	lta_los ( ne _mkt (v	level o	orice wi	th VAT												
	TPM policy levers	32	Passenger Demand Freight Demand	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c	mp_del wait_tin	ta_los ( ne _mkt (v n (vehic	level o	orice wi	th VAT	ology											
	TPM policy levers	32 33 34 35	Passenger Demand Freight Demand Vehicle Stock Environment	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a	mp_del wait_tin ap_rpcs ap_tech	ta_los ( ne _mkt (v n (vehic	level o	orice wi	th VAT	ology											
	TPM policy levers	32 33 34 35 36	Passenger Demand  Freight Demand  Vehicle Stock  Environment Safety	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate	mp_del wait_tin ap_rpcs ap_tech	ta_los ( ne _mkt (v n (vehic	level o	orice wi	th VAT	ology											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a	mp_del wait_tin ap_rpcs ap_tech d), i_vs_	ta_los ( me :_mkt (v n (vehic _nf_rail	rehicle ple capit	orice wi al costs non fue	th VAT techn	ology											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand  Freight Demand  Vehicle Stock  Environment Safety	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c i_vs_c related n/a n/a	mp_del wait_tin ap_rpcs ap_tech	ta_los ( nemkt (v n (vehic _nf_rail	rehicle   le capit _othc (r	orice wi al costs non fue ): Towa	th VAT, - techn l opera	ology tional											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a  Europe integr. Officia	mp_del wait_tin ap_rpcs ap_tech d), i_vs_ ean Con ated Eu al Public	ta_los ( me s_mkt (v n (vehic _nf_rail  mmission ropean cations	rehicle   le capit _othc (r	price wi al costs non fuel ): Towa area. C	th VAT - techn l operar	ology tional											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a  Europe integr. Officia	mp_del wait_tin ap_rpcs ap_tech d), i_vs_ ean Con ated Eu	ta_los ( me s_mkt (v n (vehic _nf_rail  mmission ropean cations	rehicle   le capit _othc (r	price wi al costs non fuel ): Towa area. C	th VAT - techn l operar	ology tional											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a Europe integr Officia	mp_del wait_tin ap_rpcs ap_tech d), i_vs_ ean Con ated Eu al Public nunities	Ita_los ( nemkt (v n (vehic _nf_rail  nmissic ropean cations , Luxem	rehicle   le capit _othc (r on (2008 railway of the E	orice wi al costs non fuel ): Towa area. C uropea	th VAT, - techn l operation	ology tional											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a  Europe integr Comm	mp_del wait_tin ap_rpcs ap_tech d), i_vs_ ean Con ated Eu al Public	Ita_los ( nemkt (v n (vehic _nf_rail  nmissic ropean cations , Luxer  nmissic	rehicle   le capit _othc (r on (2008 railway of the E	price wi al costs non fuel ): Towa area. C uropea	th VAT - techn l opera rds an office fo	ology tional											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c relate n/a n/a Europe integr Comm Europe Impact	mp_del wait_tin ap_rpcs ap_tech d), i_vs ean Con ated Eu al Public aunities ean Con t Assess hite Pap	ta_los ( ne s_mkt (v n (vehic _nf_rail  nmissic ropean cations , Luxem nmissic sment - per Roa	rehicle   le capit _othc (r on (2008 railway of the E abourg.	): Towa area. C uropea c): Sum panying	rds an mary of docum e Europ	ology tional or f the eent to pean											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i p_fd_v i_vs_c i_vs_c related n/a n/a  Europe integr. Comm  Europe Impact the Wi Transp	mp_del wait_tin ap_rpcs ap_tech d), i_vs ean Con ated Eu al Public aunities ean Con t Assess hite Pap oort Are	ne me mkt (v n (vehic nf_rail nmissic ropean cations , Luxer nmissic sment - per Roa a - Tow	rehicle   le capit _othc (r  on (2008 railway of the E abourg.  on (2011 Accom dmap to ards a c	c): Sumpanying	th VAT - techn l operar	ology tional or f the tent to bean											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_l i_pd_i i_pd_i i_pd_i i_vs_c i_vs_c relate: n/a n/a  Europe integr: Comm  Europe Impac the W  Transp resour	mp_del wait_tin ap_rpcs ap_tech d), i_vs ean Con ated Eu al Public sunities ean Con t Assess hite Pap oort Are	me mkt (vehice nf_rail mmission ropean cations and Luxer mmission ment - per Roa a - Tow cient trail	rehicle ple capit of the Embourg.  on (2008 railway of the Embourg.  on (2011 Accomplements a capital and a capita	orice wi al costs non fuel ): Towa area. C uropea c): Sum panying o a Singl ompeti system	th VAT - techn l operar	ology tional or f the eent to bean d											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i j_pd_i j_vs_c i_vs_c relater n/a n/a Europe integr. Officia Comm Europe Impac the W Transpresour final, \$	mp_del wait_tin ap_rpcs ap_tech d), i_vs ean Con ated Eu al Public aunities ean Con t Assess hite Pap oort Are cree effic SEC(201	ita_los ( memkt (v n (vehic _nf_railmemissic ropean cations , Luxer mmissic mement - per Roa a - Tow cient tra	rehide   le capiti   le capiti	orice wi al costs non fuel ): Towa a area. C uropeal c): Sum panying o a Singl ompeti system M (2012	th VAT, - techn operat  rds an  fffice fc n  mary o' docum e Europ tive and (SEC(20)	ology tional or of the eent to pean d 011) 358 nal											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i pd_i pfd_i psd_i	mp_del wait_tim ap_rpcs wait_tim ap_rpcs ap_techd), i_vs_	ita_los ( memkt (v n (vehici nf_rail mmissic ropean racations , Luxem mmissic mment - per Roa a - Tow iii 1) 391 f	rehicle   le capit   l	brice wi al costs non fuel ): Towa area. C c): Sum po a single o mpeti system M (201:	th VAT, - techn operat  rds an  fffice fc n  mary o' docum e Europ tive and (SEC(20)	ology tional or of the eent to pean d 011) 358 nal											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i pd_i pfd_i psd_i	mp_del wait_tin ap_rpcs ap_tech d), i_vs ean Con ated Eu al Public aunities ean Con t Assess hite Pap oort Are cree effic SEC(201	ita_los ( memkt (v n (vehici nf_rail mmissic ropean racations , Luxem mmissic mment - per Roa a - Tow iii 1) 391 f	rehicle   le capit   l	brice wi al costs non fuel ): Towa area. C c): Sum po a single o mpeti system M (201:	th VAT, - techni operal	ology tional or of the eent to pean d 011) 358 nal	3										
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i pd_i pfd_i psd_i	mp_del wait_tim ap_rpcs wait_tim ap_rpcs can con ated Eu al Public inunities ean Con At Assess con the Paparot Arecce efficient at Bush at Assess can can at Assess can can at Assess ca	ita_los ( memkt (v n (vehici nf_rail mmissic ropean racations , Luxem mmissic mment - per Roa a - Tow iii 1) 391 f	rehicle   le capit   l	brice wi al costs non fuel ): Towa area. C c): Sum po a single o mpeti system M (201:	th VAT, - techni operal	ology tional or of the eent to pean d 011) 358 nal											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i_pd_i p_fd_v i_vs_c i_vs_c n/a n/a Europe integr. Officia Comm Europe Impact the Wi Trasour final, \$ Safety - ERA A	mp_del wait_tim wait_tim ap_rpcs wait_ti	Ita_los ( ne nemkt (v l (vehic _nf_rail  mmissic ropean cations , Luxem mmissic ar Roa ar Roa ar Roa (1) I Indust	rehicle le capitothc (i _othc (i _ot	price wi al costs soon fuel ): Towa area. C curopea c): Sum panying a a Singl monoster with a cost in a co	th VAT technic operariant oper	ology tional or of the elent to opean d d 1011) 358 nal											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i_pd_i p_fd_v_ i_vs_c i_vs_c i_vs_c i_relate: n/a Puropei integra Officia Comm Europei Impaci the Wi Transp resour final, \$ Roland Europei Safetyy - ERA / - FRA / - FRA /	mp_del mp_del wait_tim main_rups mp_del d), i_vs main_d), i_vs main_d), i_vs main_d), i_vs main_d), i_vs main_d), i_vs main_d)	Ita_los ( me memkt (vmkt	rehicle le capit _othc (r _oth	c): Towa area. C uropeal c): Sum panying a Singl ompeti system (2012)	th VAT, - techn operards an operards an operards an operards and opera	ology tional  or  f the eent to bee ill 111) 358 nal											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i_pd_i p_fd_v_c i_vs_c i_vs_c relate n/a n/a Europpi Officia Comm Europpi Impac the W Transpresour final, \$ Roland Europpi Safety - ERA A - FAWI Harmo	mp_del wait_tim wait_tim ap_rpcs wait_ti	ita_los ( memkt (vmkt (	rehicle le capit _othc (r _oth	c): Towa area. C uropeal c): Sum panying a Singl ompeti system (2012)	th VAT, - techn operards an operards an operards an operards and opera	ology tional  or  f the eent to bee ill 111) 358 nal	3										
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i_pd_i i_pd_i i_pd_i i_vs_c relate: n/a n/a Europe integra Officia Comm Europe Impac thorac Europe Safety - ERA / - Fawle Harmc Harm	mp_dell mait_tin ap_rpcs ap_tech ap_te	ita_los ( nemkt (v nemkt (v not vehicles not vehic	in (2008 railways of the E abourg. Control of	brice wi al costs con fuel ): Towa area. C ): Sum po a Singl o a Singl or a S	th VAT, - techni l operar  rds an iffice for n mary or docume e Europ (SEC(2011) 144 fil lar 2011 alar 201	ology tional  or  f the leent to leent lee	3										
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i_pd_i i_pd_i i_vs_c relate: n/a n/a Europe integr. Officia Comm Europe Impac the Wi Roland Europe Safety - ERA / - Fawli Harmo and Mauro OF HU	mp_del wait_tin	ita_los ( memkt (v memkt (v to (vehician) f, rail  mmissic ropean ractions ropean ractio	rehide   le capit   le	porice with a costs of the cost of the cos	rds an office for n mary or docum e Europtive and (SEC(2011) 144 fill properties and office for said of the form o	ology tional  or  f the leent to leent lee											
	TPM policy levers	32 33 34 35 36 37	Passenger Demand Freight Demand Vehicle Stock  Environment Safety Comments	i_pd_i j_pd_i j_pd_i j_pd_i j_vs_c i_vs_c relate. n/a  Europe integra Officia the Wi Transp resour final, \$.  Roland Europe Safety - ERA / - FAW / - Harmc and M - Maui RAILW RAILW RAILW	mp_dell mait_tin ap_rpcs ap_tech ap_te	ita_los ( nemkt (v	rehide   lecapit   lecapit	porice with a costs of the cost of the cos	rds an office for n mary or docum e Europtive and (SEC(2011) 144 fill properties and office for said of the form o	ology tional  or  f the leent to leent lee											

### 1.1.3 Freight Corridor Management (3)

Section		0	Policy name	Freigh	t corrid	or man	agemei	nt									1				
A		1	Policy Area	5 Inter	nal ma	rket/ 3.	Resear	ch and i	nnovati	on							1				
		2	Policy Category	Intern	al mark	et															
		3	Policy Subcategory	5.1.2 R	ail - int	ernal m	arket/	3.2.3 Te	chnolog	gy and i	nfrastru	icture									
		4	Transport Policy Measure				d appr	oach to	rail freig	ght cor	ridor ma	nagem	ent, ind	cluding	rail trac	k					
					charge												-				
			Main Targets					ht corri			nt.						4				
		ь	White Paper Reference				-	d mobil port Are		em											
								narket f		ervices											
В						Pass	enger						Freigh	ıt			1				
							_					ê					1				
				_	a g	rb ad	_	5 E	≥ S	_	a g	rba Ba		>	Sea	m.					
				Rail	Road (Urban)	Road (Non-Urban)	Ą	Public	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	W	Short Sea	Maritime					
					_	ž		F				ž			S	2					
	٠ ۵	7	Volume [passenger/tons]							1		0		0			Ì				
	Indirect Traffic Impacts	8	Transport performance [vkm]							7		1		0			1				
		_	Transport performance [pkm/tkm]				-			1				_			1				
				-						<del></del>		1		7		-	-				
			Travel time [min]							9											
			Travel distance [km]				<u> </u>					<u> </u>	<u> </u>	_							
		12	Out of pocket costs [EUR/vkm]			<u></u>	L	<u>L</u> _		<i>₽</i>		L_	<u>L</u> _	<u></u>	L	<u>L</u>					
	ect fic	13	Other cost components [EUR/vkm]							⇒											
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)																Sectora		
	_	15	Comments															ral	_	t	
	1																Overall	Aggricultura	Industria	Transport	Other Services
																	Š	gric	npu	Iran	Serv
		_																			
			Economic growth [gdp]														⇒	⇒	⇒	1	⇒
	. <del></del> .	_	Employment [#employed]														⇒	⇒	⇒	1	⇒
	Direct Economical Impacts	18	Resources: Energy																		
		19	Resources: Material																		1
			Other																		
		_	Comments																		
		22	Safety [#accidents/vkm, #fatalities/vkm	1]																	
	g a g	23	Other														Ī				
	Direct Social Impacts	24	Comments														-				
	_	24	Comments																		
		25	CHCii [-/.d.m.]	-	1			1	1		1	1		_	1	_	_				
	t ent		GHG emissions [g/vkm]	<u> </u>																	
	Direct vironmer l	26																			
	Direct Environmenta I Impacts		Other	<u> </u>																	
	ū	28	Comments				_						_	_			_				
				>					+												
	TPM translation			Demography	Economy & Resources	ger	# E	ڡᅩ	Environment	-											
	nsla			oge	Economy 8	Passenger Demand	Freight	Vehicle Stock	l io	Safety											
С	l tra			Dem	S §	Pa D	ت ت	> "	Ē	0,											
	₹	29	HT Modules addressed by TPM	Χ	Х	Х	✓	<b>V</b>	X	Χ											
			Demography	n/a		^					1										
	ý		Economy & Resources	n/a																	
	levers	32	Passenger Demand	n/a																	
		33	Freight Demand	p_fd_v	vait_tir	ne, p_fo	d_load_	time,													
	DO .							ad_facto													
	ТРМ policy		Vehicle Stock		f_rail_c	othc (no	n fuel	peratio	nal cost	t)											
	-		Environment	n/a																	
			Safety Comments	n/a																	
			References	Δςςιςτ	Delive	rahla 2	1. Acce	ssment	of the S	Social											
		٠,	References					nsport l		Jociai											
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		46	r chorineu by	INIT							1										

### 1.1.4 Maritime Traffic Management System (10)

Section		0	Policy name	Mariti	me traf	fic mana	gemer	ıt syste	m								1				
A			Policy Area			rket/3F				on							1				
		_	Policy Category		al mark		icscare	ii dila ii	movaci	J11							1				
		3	Policy Subcategory	5.1.4 N	/Jaritime	e intern	al mark	et/ 3.1	.3 Trans	port inf	ormatio	n syste	ms, ma	nagem	ent and	service					
																	<u> </u>				
		4	Transport Policy Measure	-				-			nt autho										
											Blue Be										
						ie Lanes															
		5	Main Targets								rt (cargo										
											d port fa to road,					ie					
		- 6	White Paper Reference			t and in				•											
		ľ	White raper hererence			uropear															
										rket acc	ess to p	orts									
В						Pass	enger						Freigh	t							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
				æ	8 J	Rc (Non-	<	Pul	S S	82	R (Ut	Rc (Non-l	<	≥	Shor	Mari					
	+ "	7	Volume [passenger/tons]							⇒		⇒		1	1	1	ĺ				
	Indirect Traffic Impacts	8	Transport performance [vkm]							⇒		⇒		1	1	1	1				
	2 F E	9	Transport performance [pkm/tkm]							⇒		⇒		7	7	7	1				
		10	Travel time [min]		<del>                                     </del>				<del>                                     </del>	+	1	+	$\vdash$	<del>  "</del>	<i>y</i>	<i>y</i>	1				
	-		Travel distance [km]	ļ	-		-	<del>                                     </del>	<del>                                     </del>	1	1	1	-	-	72	72	1				
	-		Out of pocket costs [EUR/vkm]		-				-			-		-	-		-				
	-	_		ļ	-		<u> </u>	<u> </u>	<del>                                     </del>	1	1	<del>                                     </del>		-	⇒ .	⇒ .	-				
			Other cost components [EUR/vkm]				<u> </u>		L	<u> </u>		<u> </u>			0	0	<u> </u>				
	Direct Traffic Impacts		Qualitative effects (e.g. liability,) Comments	The of	fects >=	e varvir	ng dun *	n the d	ifferon	tromp	onents o	of the r	olicy \*	/heress	impro	ing IT	<del>                                     </del>		Sectora	_	_
				Howev access atttrac mariti	ver, con / waitir tive. Th me den	ng times iis chan	g solely are ex ge in th d shift l	the IT: pected roughp ninterla	services to decr ut time	deplore ease the and co	yment, erefore nseque om road	, makin ntly in c	g wate osts wi	transp	ort mor ase the	e	Overall	Aggricultural	Industrial	Transport	Other
		16	Economic growth [gdp]				I	<u> </u>									⇒		⇒	1	
	_	17	Employment [#employed]														⇒		⇒	7	
	Direct Economical Impacts	18	Resources: Energy																		
	ід <u>о</u>	19	Resources: Material																		
		20	Other																		
		_	Comments			1				1		1				1					
	Direct Social Impacts		Safety [#accidents/vkm, #fatalities/vkm]													0					
	Soc		Other																		
			Comments GHG emissions [g/vkm]							1							-				
	g je g	_	(Local) air pollution [g/vkm]														-				
	Direct Environmenta    mpacts		Other									ļ					-				
	E -		Comments														1				
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
_	Δ	29	HT Modules addressed by TPM	X	X	Х	./	Х	Х	<b>√</b>	1										
	<u> </u>	_	Demography	n/a	_ ^	^	. ·	_ ^	_ ^	. •	1										
	S		Economy & Resources	n/a																	
	TPM policy levers	_	Passenger Demand	n/a																	
	Ji C	33	Freight Demand			ne, p_fo ne, p_fo			,												
	ž S	34	Vehicle Stock	n/a	wait_tii	iie, p_ic	_IIXEU	_cost													
	₽	35	Environment	n/a																	
		_	Safety	i_sa_fa	at_risk_	sss (fata	ality ris	k short	sea)		1										
			Comments References	A C C I C T	D-II	rable 2.	1. 4		-646-1	C = =! = I											
		· +/	1000	Measu Safety EMSA	onomic ires, Fac : : Accider	Impact ct Sheet nt Revie	s of Tra : 26 (Kri w repo	nsport tzinger rts	Policy et al., 2	013).											
		AC	Performed by			Maritir the Sta			na Hum	ıdfi											
		4	i chomica by	1711							J										

### 1.1.5 Enhance Service Quality at Ports (12)

Section		0	Policy name	Enhan	ce serci	ce quali	ty at po	rts													
Α		1	Policy Area	5 Inter	nal mai	ket															
		2	Policy Category	Intern	al mark	et															
			Policy Subcategory	5.1.4 N	/laritime	intern	al mark	et													
		4	Transport Policy Measure	Reviev	v restri	ctions o	n provi	sion for	port se	rvices											
		5	Main Targets	Open	ort ser	vices, li	ke tech	nical-n	autical a	and car	go hand	ling ser	vices, to	o comp	etition	to					
				reduce	costs a	ind enh	ance qu	iality ar	d reliat	oility.											
		6	White Paper Reference			and int				em											
						ıropear maritin				ket acc	ess to p	orts									
											,										
В						Pass	enger						Freight								
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
	+ v	7	Volume [passenger/tons]							→	⇒	⇒	→	⇒	1	⇒	1				
	Indirect Traffic Impacts	8	Transport performance [vkm]							⇒	⇒	⇒	⇒	→	1	⇒					
	<u> </u>	9	Transport performance [pkm/tkm]								+		_		7	+	1				
			Travel time [min]							⇒	⇒	⇒	⇒	⇒	-	⇒	1				
							-	-		ļ	1	<b> </b>	-				1				
			Travel distance [km]					<u> </u>			1	<u> </u>	<u> </u>				1				
			Out of pocket costs [EUR/vkm]																		
	Direct Traffic Impacts	13	Other cost components [EUR/vkm]												<b>₽</b>	0					
	Tra Tra	14	Qualitative effects (e.g. liability,)	Increa	sed inte	ropera	oility be	etween	ICT syst	tems aı	nd wate	rborne	sectors						Sectora	ı	
		15	Comments			rginal d inland v				ive cos	ts resul	ting in a	minor	modal :	shift to	Short	Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]														⇒	⇒	⇒	n	⇒
	-	17	Employment [#employed]														⇒	⇒	⇒	1	⇒
	mic at	18	Resources: Energy																		
	Direct Economical Impacts	19	Resources: Material																		
	<u>a</u> –	20	Other																		
			Comments																		
	s		Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	23	Other														1				
	<u>⊒</u> S <u>E</u>		Comments														1				
	<u></u>		GHG emissions [g/vkm]														1				
	cts m		(Local) air pollution [g/vkm]																		
	Direct ironmen Impacts		Other														1				
	Direct Environmental Impacts																1				
			commend														-				
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
	Ē	29	HT Modules addressed by TPM	Χ	Χ	Χ	<b>√</b>	<b>√</b>	Χ	Х	İ										
		30	Demography	n/a	· ·				· ·	· ·	İ										
	S		Economy & Resources	n/a																	
	eve	32	Passenger Demand	n/a																	
	TPM policy levers	33	Freight Demand		oad_tin vait_tin	ne, p_fd	_unloa	d_time													
	N P	3/1	Vehicle Stock			opcost (	non fu	loner	tional c	nete)											
	Ē		Environment	n/a	_111dl_	puosi (	nonnue	. opera	croridi (	0313]											
			Safety	n/a																	
			Comments	i i							Ť –										
			References	enhan		npact as				res to											
		48	Performed by	KIT																	

### 1.1.6 Opening the Internal IWW Market (14)

Section		Ī	0	Policy name	Openi	ng the i	nternal	IWW n	narket				-	-	-	-		1				
A		t	1	Policy Area	5 Inter	nal ma	rket															
			2	Policy Category		al mark																
		Ī	3	Policy Subcategory	5.1.3 lı	nland w	aterwa	y trans	ort int	ernal m	arket											
			4	Transport Policy Measure	Establi	ishes ar	appro	priate f	ramew	ork to o	ptimise	the Int	ernal M	arket fo	or Inlan	d Water	way					
					Transp	ort, an	d to ren	nove ba	rriers t	hat prev	ent its	increas	ed use.	Assesse	es and o	defines	the					
							ks and r	mechan	isms fo	rtheire	execution	on, also	with a v	iew to	the wid	der Euro	pean					
					contex	ct.																
		Π	5	Main Targets									to impro		ciency a	and red	uce					
					transp	ort cost	s relate	ed to re	gulatio	ns and a	dminis	trative l	barriers									
			6	White Paper Reference						lity syst	em											
								n Trans														
					initiati	ve 5: A	suitabi	e trame	work to	or inlan	a naviga	ation										
_		-	-														_	1				
В						_		enger		_		1	_	Freight	t	_	_	-				
					Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)	Air	IWW	Short Sea	Maritime					
		. 1	7	Volume [passenger/tons]							0		0		1							
	Indirect Traffic			Transport performance [vkm]	l			<b>†</b>	<b>-</b>	1		1	1		<u> </u>	1		1				
	Indi				<b> </b>	<u> </u>		<u> </u>	-	+	7	1	- /		7	-		-				
				Transport performance [pkm/tkm]					<u> </u>		1		1		1			_				
	1	ſ	10	Travel time [min]						1		1			⇒							
	1	ŀ	11	Travel distance [km]														1				
		ŀ	_	Out of pocket costs [EUR/vkm]	l —			<del>                                     </del>	1	+	<del>                                     </del>	<del>                                     </del>	<del>                                     </del>		<i>8</i>			1				
		ŀ			<b> </b>			1	1	1	1	1	1		_	-		-				
	Direct Traffic	L		Other cost components [EUR/vkm]	ļ				<u> </u>			<u> </u>			1			1				
	<u> </u>	[		Qualitative effects (e.g. liability,)																Sectora	<u>⊢</u>	
			15	Comments														Overall	Aggricultural	Industrial	Transport	Other Services
			16	Economic growth [gdp]														⇒	⇒	⇒	1	
	<del>_</del>	Ī	17	Employment [#employed]														⇒	⇒	⇒	1	
	Direct Economical Impacts		18	Resources: Energy																		
	Dire	-		Resources: Material				1														
	<u> </u>	·  -		Other				ļ														
		ŀ		Comments																		
		$\dashv$		Safety [#accidents/vkm, #fatalities/vkm]		l l		T	1	Т	1	1	T T		Ι			1				
	# = £	.																				
	Direct Social Impacts		_	Other													_	-				
	_ o s <u>s</u>		24	Comments									ime reg			umber	DŤ 10					
		_	_		enterp	rises c	an impr	ove sigi	irricant	iy saret	y conai	tions of	operati	ons. [1]	1		,	_				
	¥	s,	25	GHG emissions [g/vkm]																		
	Direct ironme	Impacts	26	(Local) air pollution [g/vkm]																		
	Direct Environmenta I	Ξ	27	Other			*						-									
	ᇤ		28	Comments																		
С	TPM translation				Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
	₽	ſ	29	HT Modules addressed by TPM	Χ	Χ	Χ	✓	✓	Χ	✓											
		T	30	Demography	n/a																	
	vers	ſ	31	Economy & Resources	n/a																	
	TPM policy levers	Ī		Passenger Demand	n/a																	
	olio l			Freight Demand				d_wait_	time													
	Š	L		Vehicle Stock		stiww (	IWW co	sts)														
	Ā	L		Environment	n/a																	
		_		Safety	i_sa_fa	at_risk_	iww (fa	atality ri	sk iww	)		1										
		_		Comments																		
			47	References	and Ec	onomi	Impact	ts of Tra	nsport	of the Policy et al., 2												
					the "Si Barrie	tudy on	Admin field o		e and R	inanl Re egulato rway		r										
		ţ	48	Performed by	KIT																	

### 1.1.7 Harmonized Social Rules for Truck Drivers (23)

Section		(	Policy name	Harmo	nized s	ocial ru	les for t	ruck dri	vers								1				
Α		1	1 Policy Area	5 Inter	nal mar	rket															
		- 2	Policy Category	Intern	al mark	et															
		3	Policy Subcategory			al trans															
		4	Transport Policy Measure						_		ns for t										
											and wo				uck driv	-					
				ers, as	suming	an imp	act on t	ravel co	sts and	travel	time for	r the tru	ck mod	e.							
			Main Targets								nized so										
											r condit										
						e sater ied effe					itions, t	o guarai	ntee tn	at road	transpo	rt					
		-	White Paper Reference			g qualit															
			Winte Laber Reference	1.2.11	omoun	g quaire	y jobs a	iiu woii	ang cor	idition.	,										
В		T				Dacc	enger						Freight								
						_	l					_	- reigin	T							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	IWW	Short Sea	Maritime					
	# 0 E	1	7 Volume [passenger/tons]							⇒		⇒									
	Indirect Traffic Impacts	8	Transport performance [vkm]								⇒	⇒									
	<u> </u>	9	Transport performance [pkm/tkm]								⇒	⇒					ĺ				
		10	Travel time [min]							<del>                                     </del>	1	7					1				
		_								<b> </b>	1	-				-	-				
		_	1 Travel distance [km]																		
	t ∴ t	_	Out of pocket costs [EUR/vkm]								1	1									
	Direct Traffic Impacts	13	Other cost components [EUR/vkm]																		
		14	Qualitative effects (e.g. liability,)																Sectora		
		15	5 Comments														Overall	Aggricul tural	Industri al	Transpor t	Other Services
		16	Economic growth [gdp]																	⇒	
	<del>-</del>	17	Employment [#employed]																	⇒	
	Direct Economical Impacts	18	Resources: Energy																		
	Dire ono mpa	_	Resources: Material															<del>                                     </del>			$\vdash$
	- E	_																			ш—
		20	Other Comments																		
			2 Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	1	,,		7	0			⇒												
	Din Soc mp	23	Other																		
			4 Comments																		
	ntal	25	GHG emissions [g/vkm]																		
	Direct Environmental Impacts	26	(Local) air pollution [g/vkm]																		
		27	7 Other																		
	En	28	Comments														]				
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
-	Ψ	20	HT Modules addressed by TPM	X	X	Х	./	./	Х	/	1										
		30	·	n/a			_ v	_ v			1										
	ers		1 Economy & Resources	n/a							1										
	TPM policy levers		2 Passenger Demand	n/a							1										
	liο		Freight Demand		peed (t	to mode	l travel	time cl	nanges)												
	οdν		4 Vehicle Stock			st_labo															
	Ē		Environment	n/a																	
		_	Safety	i_sa_s	oeed_tr	ruck, i_s	a_fatig	ue_truc	k		<u> </u>										
			Comments								1										
			References		fact she	et no. 2	21				1										
		48	Performed by	TML							J										

### 1.1.8 Safety Systems for Road Vehicle Users (33)

Section			Policy name	Safety	system	s for ro	ad vehi	cle use	rs								1				
A		1	Policy Area		arch an												1				
		_	Policy Category		rch and																
		3	Policy Subcategory	3.2.1 T	ranspor	rt safety	,														
		4	Transport Policy Measure	road v		such as	driver					chnical reminde									
		5	Main Targets	Road a	ccident	s cause	huge e					society.									
						-						and red									
		6	White Paper Reference	1.4. Ac road s	-	transpo	ort safe	ty: savir	ng thous	ands o	f lives, i	.e. (16)	Toward	ls a 'zeı	o-visio	n' on					
В						Pass	enger						Freight								
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
		7	Volume [passenger/tons]		⇒	⇒					⇒	⇒									
	Indirect Traffic Impacts	8	Transport performance [vkm]		⇒	⇒					⇒	⇒					1				
	말부분	_	Transport performance [pkm/tkm]		1						1						1				
		-		<u> </u>	⇒	⇒	-	-	-	<del>                                     </del>	⇒	⇒		<u> </u>			1				
			Travel time [min] Travel distance [km]		⇒	⇒					⇒	⇒									
	- u s	12	Out of pocket costs [EUR/vkm]																		
	Direct Traffic Impacts	13	Other cost components [EUR/vkm]		1	n					1	1					Ĭ				
	ㅁ누 <u>ể</u>	14	Qualitative effects (e.g. liability,)		· •	<u> </u>					· •								Sectora		
			Comments														Overall	Aggricul	-=	Transpor t	Other Services
		16	Economic growth [gdp]															_	7		- 0,
	_	_	'Employment [#employed]																7		-
	Direct Economical Impacts	_	Resources: Energy																-		
	Dire	$\vdash$																			
	- 8 =	$\vdash$	Resources: Material																		
			Other																		
		_	Comments Safety [#accidents/vkm, #fatalities/vkm]		1	1	1	1	1	1	1			1	ı		1				
	g a g		Jaiety [#accidents/vkm, #ratanties/vkm]		₩.	₩.			1		1	↓				1					
	Direct Social Impacts	23	Other		-	!					-						i				
		_	Comments																		
	Direct Environmental Impacts	25	GHG emissions [g/vkm]																		
	ect acts	26	(Local) air pollution [g/vkm]																		
	멸혈별	27	Other									-				-	1				
	Ēην	28	Comments																		
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
•	T M	20	HT Modules addressed by TPM	X	X	Χ	_	./	Х	<b>√</b>	1										
	<u> </u>	_	Demography	n/a	_ ^	_ ^	_ ^		^		1										
		-	Economy & Resources	n/a							1										
			Passenger Demand	n/a																	
			Freight Demand	n/a																	
			Vehicle Stock		f_cstins	u (insu	rance c	osts)													
			Environment	n/a																	
		30	Safety		peed_tr peed_p																
	5				_dui_tr				uence),												
	TPM policy levers				_dui_ca																
	ĒÇ				istractio					,											
	od v				istractio																
	₽ E				atigue_1 atigue_1				,												
					estraint				d restra	ints),											
					estraint																
					ime_me					ite											
					al care)			d_care	_car,												
					ime_me																
					ime_me eh_defe			veh de	efect ca	ır.											
					eh_def																
			Comments																		
			References		fact sh	eet no.	57				1										
		48	Performed by	TML							J										

# 1.1.9 Road Vehicle Safety Technology Protecting Other Transport Users (37)

Section			0	Policy name	Road v	ehicle	afetv t	echnol	ogy prot	ecting	otherti	ranspor	t users					1				
A			1	Policy Area		arch an			3, p. o.	6								-				
			2	Policy Category		rch and																
			3	Policy Subcategory	3.1.1 V	ehicle 1	Techno	logy														
			4	Transport Policy Measure			icle te	chnolog	gies for	/ulnera	ble use	ers such	as ped	lestrians	s, cyclist	s and	_					
			- 5	Main Targets		cyclists	rnad sa	efety ter	hnolog	es nas	sive an	d activ	e focus	sing on	vulnera	hle tran	snort					
			ر	iviaii raigets										ike auto								
			6	White Paper Reference	1. An e	fficient	and in	tegrate	d mobil	ity syst	em											
									y: savin													
					Initiati	ve 16: T	oward	s a 'zero	-vision	on roa	d safet	У		_								
							_									_	_	ī				
В								enger	1			1	1 -	Freigh	ıt	_						
					=	ad (ne	Road (Non-Urban)	_	Public Transport	se ×	=	ad (an)	Road		>	Sea	ine					
					Rail	Road (Urban)	Road on-Urb	Air	Put	Slow	Rail	Road (Urban)	Road	Air S	WM	Short Sea	Maritime					
							z		-				3	-		0,	_					
	<b>ت</b> ي	, <u>1</u> 2		Volume [passenger/tons]		⇒	⇒		⇒	1												
	Indirect	трас	8	Transport performance [vkm]		⇒	⇒		⇒	1												
	= .	=	9	Transport performance [pkm/tkm]		⇒	⇒		⇒	1												
			10	Travel time [min]																		
			11	Travel distance [km]																		
			12	Out of pocket costs [EUR/vkm]																		
	Direct	cts	13	Other cost components [EUR/vkm]		n	n															
	Dire	ш	14	Qualitative effects (e.g. liability,)																Sectora		
		_	15	Comments										sts are n		. The fr	eight		ıral	al	ť	S
														d efficie		25025	Thic	Overall	불	Industrial	Transport	Other Services
									ın thıs p reight d					mainly oice.	uroar	ı aı eas.	11115	Š	Aggricultural	la p	Tra	Ser
			16	Economic growth [gdp]					,									1	<	7		$\vdash$
	_	.		Employment [#employed]																7		H
	Direct	St		Resources: Energy																"		
	Dire	m g	19	Resources: Material				1					1					<b>—</b>	<b>†</b>			$\vdash$
	ű	3 -	20	Other															1			
			21	Comments																		
	ti 16	ts	22	Safety [#accidents/vkm, #fatalities/vkm]		0	0		0	₩												
	Direct	npa	23	Other				•						•	•							
			24	Comments								_										
	Direct Environmenta	S		GHG emissions [g/vkm]		⇒	⇒															
	Direct	l Impacts	26	(Local) air pollution [g/vkm]		⇒	⇒															
	ovir	Ξ		Other																		
	ū		28	Comments				_	_				_	_								
С	TPM translation				Demography	Economy & Resources	Passenger	Freight	Vehicle Stock	Environment	Safety											
	ď		29	HT Modules addressed by TPM	Χ	Χ	Χ	Χ	✓	Х	✓											
			30	Demography	n/a																	
				Economy & Resources	n/a																	
				Passenger Demand Freight Demand	n/a n/a																	
				Vehicle Stock		ap rpcs	mkt (v	vehicle	price wi	th VAT	),											
	u	,							sts - tec													
	707.0			Environment	n/a																	
	2		36	Safety		lind_sp		k														
	TPM policyloyers	2						/ (distra	ction (b	y devic	e))											
	Į.					atigue_r																
						eh_defe beed_bi		N														
								e (distra	ction (b	y devic	e))											
						atigue_b																
						elmet_l eh_defe		e														
			37	Comments	1_30_1	en_den	cc_biic					1										
				References	Safety	:																
									REPORT													
							UATIO	N OF TH	E RSAP	SPECIFI	С											
					CONTR		43-200.	71 ot 21	mpact A	ccaccm	onts											
									of trans													
					prepar	ation o	f the Eu	uropean	Road S	afety A	ction											
						m 2011-																
									mundse OI repoi													
						Vorway		aciits. i	оттерог	1 740/2	004,											
								9). The I	nandboo	ok of ro	ad											
						measur																
									effectiv nd sele		me											
									, 18:229			1										
					Phan,	V. et al.	(2009)	. Rider /	Driver	behavi	ours											
									Safe D1													
					LC FP7			A deliv	erables,	Tact sh	eets	1										
					and sta	atistics (	http://	/safetyk	nowsys	.swov.ı	nI)											
					and sta ETAC E Maids,	atistics ( uropea In-dep	http:// n Truck th inve	/safetyk Accide stigatio	nowsys nt Caus ns of ac	.swov.i	nl) udy											
					and sta ETAC E Maids, involvi	atistics ( uropea In-dep ing pow	http:// n Truck th inve ered to	/safetyk Accide	nowsys nt Caus ns of ac	.swov.i	nl) udy											
			40	Performed by	and sta ETAC E Maids, involvi	atistics ( uropea In-dep	http:// n Truck th inve ered to	/safetyk Accide stigatio	nowsys nt Caus ns of ac	.swov.i	nl) udy											

### 1.1.10 Harmonisation of Rail Safety (42)

		_	Dollarnama	lo-	mlc=c*	n a f	Leaf.			-							1				
Section A		_	Policy name Policy Area		nisatio			ankina -	neaco	os.							-				
		L 2	Policy Area Policy Category		iency st al mark		and fl	anking r	neasur	e2	_		_		_		1				
		3	Policy Subcategory	4.1.1 T	ranspor	rt safet	y standa		_												
		4	Transport Policy Measure											ne rail tr railways							
		1		and ev	aluatin	g the p	ossibilit	ty to rel	y on a B	uropea	n stand	ard.									
														ision on ive harn							
		5	Main Targets											nonize 1			1				
		Ľ		develo	p EU ce	ertificat	ion. Str	engther	n interr	al mark						,					
		6	White Paper Reference					d mobil													
					ing on 1 ive 19: F			y: savin	g thous	ands of	lives										
3						Pass	enger						Freigh	t							
					-	oan)		🖫			-	) au			e e	9					
				Rail	Road (Urban)	Road Non-Urban	Ā	Public Transport	Slow	Rail	Road (Urban)	Road Non-Urban	Α̈́	<u></u>	Short Sea	Maritime					
					1 5	_ N		F E	. 2		1 3	S		-	š	ž					
		7	Volume [passenger/tons]	⇒						⇒		⇒		⇒			1				
	Indirect Traffic Impacts	8	Transport performance [vkm]	i ⇒						i ⇒		⇒		⇒			1				
	SFE	9	Transport performance [pkm/tkm]	⇒						⇒		⇒		⇒			1				
		10	Travel time [min]														1				
		11	Travel distance [km]	1							1		1				1				
		12	Out of pocket costs [EUR/vkm]								1						ĺ				
	202	13	Other cost components [EUR/vkm]	⇒						⇒							ĺ				
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)				1				-		-						Sectora		
	- E	15	Comments								certifica	ation an	d there	fore is e	xpecte	d to		le.	_	t	
								sts and order bu			inces co	mpetit	ion whi	le inves	tments	into	Overall	롸	Industria	Transpor	Other
		l		safety	increas	es cost	. Only s	light im	pact or	passer				ese are			ó	Aggricultural	Indi	Tran	ĺ
		L	Economic growth [c-1-1	marke	ts, not a	affecte	a as stro	ngly as	treight	_							<b>—</b>		-		$\vdash$
	-	16	Economic growth [gdp] Employment [#employed]									H	H				⇒	⇒	⇒ 1	7	Ħ
-	_	_	Employment [#employed] Resources: Energy								H	F	H				⇒	⇒	⇒	n	⊨
	Direct Economical Impacts		Resources: Material																		$\vdash$
	Dire		Other																		<u> </u>
	<u> </u>																				
		21	Comments	Assum	ing the	total d	emand	for tran	sport i	ncrease	despite	of mo	dal shif	i.							
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	Direct Social Impacts		Safety [#accidents/vkm, #fatalities/vkm	7						9											
	ig S g	23	Other Comments														-				
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	Ë	28	Comments	May in	crease	the app	olicablit	y of ele	ctic rail	for cro	ss-bord	er trans	port				]				
	-	-		>	.~		-		+	_											
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	ಕಿಕ	Environmen	.≴											
	ans			mog	ouo	asse	Freig	Vehide Stock	/ion	Safety											
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							(rolling	stock f	ault)												
	Ē			i_sa_s	tock_ra																
	TPM poli			i_sa_ir	nfra_fau																
	MAT P			i_sa_ir i_sa_lo	nfra_fau :_veh_a			rossing		nt with											
	MMT			i_sa_ir i_sa_lo vehid i_sa_lo	nfra_fau :_veh_a e) :_vuln_;	cc_rail	(level-c		accide												
	д МАТ			i_sa_ir i_sa_lo vehid i_sa_lo pedes	nfra_fau :_veh_a e) :_vuln_i trian/cy	acc_rail	(level-c	rossing	accide												
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### 1.1.11 Harmonised Handling of Dangerous Goods (44)

Section		0	Policy name	Harmo	nized h	andline	g of dar	ngerous	goods					-			1				
A			Policy Area					anking		es							1				
			Policy Category		al mark												1				
			Policy Subcategory		ranspoi																
		4	Transport Policy Measure								of dang			ensure							
		5	Main Targets								l, road, s ure same			ased) le	vel in al	LEU					
			Talge to								ve interi										
		6	White Paper Reference	1. An e	efficient	t and in	tegrate	d mobil	ity syste	em											
								y: savin		ands o	flives										
				Initiati	ive 20: 1	ranspo	rt of da	ingerou	goods												
В						Dass	enger						Funinh								
ь					T T		_	1			T	_	Freigh	1							
				_	a q	Road (Non-Urban)		Public Transport	× 8	l _	a q	Road (Non-Urban)		>	Sea	me					
				Rail	Road (Urban)	Road on-Urb	Air	Public ranspor	Slow	Rail	Road (Urban)	Road on-Urb	Αï	W	Short Sea	Maritime					
					_	Ž		=			~	ž			S	2					
	# 0 %	7	Volume [passenger/tons]							7	⇒	0		1							
	Indirect Traffic Impacts	8	Transport performance [vkm]							1	⇒	0		1							
	<u>ĕ</u> ∓ <u>E</u>	9	Transport performance [pkm/tkm]							1	⇒	0		1							
		_	Travel time [min]							-	1	-		<u> </u>							
		_	Travel distance [km]				-														
			Out of pocket costs [EUR/vkm]		-			+			-										
	9		Other cost components [EUR/vkm]							<u> </u>	-	-		<u> </u>							
	Direct Traffic Impacts	_			ļ		ļ			1	1	1		1							
	αμĒ		Qualitative effects (e.g. liability,) Comments	Limita	d impo	t or co	ctc. ma	inly dos	reace	rnee ha	rder bu	rder					<del>                                     </del>	_	Sectora		
		15	Comments	Limite	и ппрас	L UII CO	эсэ; ппа	y dec	icase (1	U35-DC	nuel DU	uell					=	tura	iri	oort	e es
				l													Overall	Aggricultura	Industria	Transport	Other Services
		L															L	Agg	드	Ļ	Ñ
		16	Economic growth [gdp]														⇒	⇒	⇒	<b>1</b>	⇒
	<u> </u>	17	Employment [#employed]														⇒	⇒	⇒	1	⇒
	Direct Economical Impacts	18	Resources: Energy																		
	면 있 <u>대</u>	19	Resources: Material																		
			Other					•											•		
			Comments	Assum	ing tha	t the to	tal den	nand of	ranspo	rt wou	ld not ch	ange o	bviousl	y, impa	ct at set	oral le	vel is no	t fores	eeable.		
	t m S	22	Safety [#accidents/vkm, #fatalities/vkm]	<b></b>		⇒				0		0									
	Direct Social Impacts	23																			
			Comments		1		1	_		1	1					1					
	ts tt	_	GHG emissions [g/vkm]				-														
	Direct /ironmer      Impacts	_	(Local) air pollution [g/vkm]																		
	Direct Environmenta I Impacts		Other Comments																		
			comments																		
	e			уhу	' &	d e			ent												
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
С	tran			emc	Resc	Pass	F. P.	St Ve	Ş	Sa											
•	Σ	29	HT Modules addressed by TPM	X	X	Х	,	,	Х	/	1										
			Demography	n/a	Λ.	Λ	<b>√</b>	<b>√</b>	Χ	<b>V</b>											
			Economy & Resources	n/a							1										
			Passenger Demand	n/a																	
	S	33	Freight Demand		wait_tin		_load_	_time,													
	eve				ınload_																
	ξ	34	Vehicle Stock		f_rof_c: reight ti			operatio	onal cos	t for											
	TPM policy levers	35	Environment	n/a	eignt ti	arispor	L)														
	₽	20	Safety	1 as 1.	oad_err	or_truc	k,														
				i_sa_st				stock f													
						sss (fat															
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		27	Commonts	i_sa_fa	at_risk_	iww (fa					1										
		37	Comments	i_sa_fa Rail be	at_risk_ ecomes	iww (fa more a	ttractiv	e and th	erefore												
		37	Comments	i_sa_fa Rail be higher	at_risk_ ecomes	iww (fa more a ctor is e	ttractiv expecte	e and the	erefore												
			Comments	i_sa_fa Rail be higher this is 1. no n	at_risk_ ecomes load fa not a fii eport y	iww (fa more a ctor is e rst orde et -	ttractiv expecte r effec	e and thed as we	erefore	ever,											
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				i_sa_fa Rail be higher this is 1. no n http:// e.htm 2. REO Overco Seaml. Corrid 3. No n http:// htm Safety Ender Maids, involv Trace	at_risk_ comes load fa not a fil eport yi www.t RTIENT Dming E ess Sen or - 200 report yi www.t	more a ctor is e rest orde et - mleuve project et arriers vice Pro 7 (not a et: mleuve et thinve et et mleuve et mleuve et thinve et et mleuve et thinve et thinve et et thinve et et thinve et et cause et et et et et et et et et et et et et	ttractive expected for a first state of the first s	e and the das we to the das we	erefore III. How corridor. es for iility and EORIEN'	ever, 2/hom d T											
				i_sa_fa Rail be higher this is 1. no r http:// e.htm 2. REO Overco Seaml Corrid 3. No r http:// htm Safety ETAC E Maids, involv Trace - Evalua	at_risk_ comes load fa not a fil eport yi www.t RTIENT Dming E ess Sen or - 200 report yi www.t	more a ctor is a	ttractive expected for a first state of the first s	e and the das we t.  Strategie roperab in the R report).  oroject/e	erefore III. How corridor. es for iility and EORIEN'	ever, 2/hom d T											
		47		i_sa_fa Rail be higher this is 1. no r http:// e.htm 2. REO Overco Seaml Corrid 3. No r http:// htm Safety ETAC E Maids, involv Trace - Evalua	at_risk_ comes load fa not a fil eport yi fil existence of the comes report yi fil existence of the comes report yi fil existence of the comes fil existence	more a ctor is a	ttractive expected for a first state of the first s	e and the das we to the das we	erefore III. How corridor. es for iility and EORIEN'	ever, 2/hom d T											

### 1.1.12 European Rail Traffic Management System (56)

		0	Policy name	Eurone	ean Rail	Traffic	Manage	ement S	ystem								1				
tion			Policy Area			d innov			,								1				
		_	Policy Category		al mark		411011										1				
		3	Policy Subcategory	3.1.3 T	ranspo	rt inforn	mation :	systems	, mana	gement	and se	vice									
		_	Transport Policy Measure					ement S													
		5	Main Targets	systen Europe 2. GSN	n desigr ean rail 1-Railwa	ned to n ways, e	eplace speciall nternati	the mar ly on hig onal wi	y incon sh-spee	npatibl d lines	, a signa e safety nication	system	s curre	ntly use	ed by	ction					
		6	White Paper Reference	2. Inno 2.1 A E	ovating uropea	for the	future: port Re	technol search a	and Inno	ovation	Policy										
						Pass	enger						Freight								
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
		7	Volume [passenger/tons]	1		0	0			1		0		⇒			i				
	Indirect Traffic Impacts	8	Transport performance [vkm]	7		9	<u> </u>	t		7	<b>†</b>	<u> </u>		⇒		<u> </u>	1				
	ind Tra		Transport performance [pkm/tkm]	<del></del>			_			<del>-</del>		_					1				
				1		0	7			1		0		⇒							
			Travel time [min]	0				<u> </u>		9							1				
			Travel distance [km]														1				
		12	Out of pocket costs [EUR/vkm]		<u>L</u> _	<u>L_</u>	<u>L</u> _	<u>L</u> _	<u>L</u> _	<u></u>	<u>L</u> _	<u></u>		<u>L</u> _	<u>L</u> _						
	ect ffic acts	13	Other cost components [EUR/vkm]	n						n											
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)		sed cap	acity. H	igher re	liability	rates.		ied app	roval pr	ocess f	or vehi	cles.	-			Sectora	ıl	
	_		Comments								rt, to ov					у					
				differe	ent nati	onal tra	in signa	alling an	d contr	ol syste	ems in e	ach cou	ntry.				Overall	Aggricultural	Industrial	Transport	Other
			Economic growth [gdp]														⇒	1	⇒	1	-
	<del>a</del>	17	Employment [#employed]														⇒	⇒	⇒	1	-
	Direct Economical Impacts	18	Resources: Energy																		Г
	ono Imp	19	Resources: Material																		T
	- E	20	Other	An one	ened su	ipply ma	arket fo	r purcha	asing ed	nuipme	nt for in	stallatio	on.								1
			Comments			FF-7		p =		1											
	E		Safety [#accidents/vkm, #fatalities/vkm]	ı						II.											
	Direct Social Impacts	23	Other	Ť													1				
	O S E	_	Comments																		
	nta	25	GHG emissions [g/vkm]																		
	Direct Environmenta I Impacts	26	(Local) air pollution [g/vkm]																		
	Direct ironme I Impact		Other																		
	Env	_	Comments																		
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	ш	Safety											
	₽		HT Modules addressed by TPM	Χ	Χ	✓	✓	✓	Χ	✓											
		_	Demography	n/a																	
			Economy & Resources	n/a	tali e																
		32	Passenger Demand			ie_weig Ita_los (		f service	٠)												
	ķ,	33	Freight Demand			travel ti		. 5014100	,												
	ever		Vehicle Stock					cost wit	h VAT),												
	cy le							iel othe			1										
	poli	35	Environment	n/a																	
	TPM policy levers	36	Safety	signall i_sa_c errors i_sa_t	ling staf rew_eri ), rack_sta	ff errors ror_rail	i), (Driver r_rail (1	il (Opera and trai	n crew												
		37	Comments	mainte	- number	Juni el	. 513]				1										
			References	http://	/www.e	ertms.ne	et/				1										
				- Fawle Harmo and M	Annual : er et al . onised T anagem	(2012) rain Ac nent	Prospe cident F	nance Rective stu	idy into ors Anal	ysis											
					y Hill a			WAY O													

### 1.1.13 River Information System (57)

Section			0 Policy name	Riveri	nforma	tion sys	tem										1				
A		$\vdash$	1 Policy Area	3 Rese	arch an	d innov	ation														
			2 Policy Category		al mark																
			3 Policy Subcategory	3.1.3 T	ranspoi	t inforn	nation :	systems	, mana	gemen	t and se	rvice									
			4 Transport Policy Measure								er Infor				_						
											ction of		tration	burden	s and						
											transpo										
			5 Main Targets								travecl t										
			6 White Paper Reference								ansport t system		ks, i.e.	timula	te the						
В		r				Passe	enger						Freight								
					7 °C	d ban)		c ort	se s		7 °C	d ban)		_	Sea	ne					
				Rail	Road (Urban)	Road (Non-Urban	Air	Publi Transp	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WW	Short Sea	Maritime					
	t o 2		7 Volume [passenger/tons]							⇒		⇒		⇒	⇒						
	Indirect Traffic Impacts	Γ	8 Transport performance [vkm]							⇒		⇒		⇒	⇒						
	<u> </u>	T	9 Transport performance [pkm/tkm]							⇒		⇒		⇒	⇒		ĺ				
		1	0 Travel time [min]	+						Ť	1	Ė		<i>a</i>	Ė		1				
			1 Travel distance [km]	-										-			1				
		_	2 Out of pocket costs [EUR/vkm]	-						-	1	<b> </b>					1				
		_		1	_		-	-		-	-	-	<u> </u>	⇒			-				
	Direct Traffic Impacts	_	3 Other cost components [EUR/vkm]														<u> </u>				Щ,
	를 다 다		4 Qualitative effects (e.g. liability,) 5 Comments														<b>!</b>	1	Sectora I	_	
			o comments														Overall	Aggricultural	Industrial	Transport	Other Services
		1	6 Economic growth [gdp]														⇒	⇒	⇒	⇒	⇒
	_	1	7 Employment [#employed]														⇒	⇒	⇒	⇒	⇒
	ct nica cts	_	8 Resources: Energy															1			
	Direct Economical Impacts		9 Resources: Material														⇒	⇒	⇒	0	⇒
	- 53 <u>-</u>	_															⇒	⇒	⇒	⇒	⇒
			0 Other 1 Comments																		
			2 Safety [#accidents/vkm, #fatalities/vkm	1		1						1									
	Direct Social Impacts		2 Sarcty (#accidents) vkiii, #ratairaes) vkii	.1																	
	Dire Soc mpa	2	3 Other																		
			4 Comments																		
	Direct Environmental Impacts	2	5 GHG emissions [g/vkm]																		
	rect nme	2	6 (Local) air pollution [g/vkm]																		
	ig ig ig	2	7 Other							•											
	ᇤ	2	8 Comments									,									
											-										
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
	TPA	2	9 HT Modules addressed by TPM	Χ	Х	Χ	✓	<b>√</b>	Х	Χ											
		3	0 Demography	n/a							1										
	S	3	1 Economy & Resources	n/a																	
	leve		2 Passenger Demand	n/a																	
	TPM policy levers		3 Freight Demand	p_fd_u	ınload_	ne, p_fo time, p	_fd_fix		,												
	Σ	_	4 Vehicle Stock		stiww (	IWW co	sts)														
	F		5 Environment	n/a							1										
		_	6 Safety	n/a							4										
			7 Comments 7 References	Vecter	fact ch	eet no.	25				1										
			8 Performed by	TML	ract sh	eet 110.	۷٦.				1										
		4	or enormed by	TIVIL		,															

### 1.1.14 Intelligent Traffic Information System for Road (58.1)

			_																			
Section			0	Policy name	Intelli	gent tra	iffic info	rmatic	n syste	m for ro	ad											
Α			1	Policy Area	3 Rese	arch an	d innov	ation /	6. Infra	structur	e											
			2	Policy Category	Resear	rch and	innovat	ion														
				Policy Subcategory								and se										
			4									nageme			_			1				
			5	Main Targets	and en	nable va	arious u	sers to	be bett	erinfor	med (R	nt road TTI - rea	l time t	raffic ar	nd trave	el inforr	nation)					
					Transp	ort info	ormatio	n and c	ommun	ication	System	se of tra	over a v	vide fie	ld with	three r	nain					
					second	d conce	nrs dyn	amic tr	affic ma			time tra !), and th					1). The					
			6	White Paper Reference		-	er assis for the			ogy and	i behav	iour										
					2.1 A E	uropea	n Trans An inno	oort Re	search a	and Inn	ovation	Policy			_							
В							Pass	enger						Freight								
							(u		+				n ()				-					
					Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	IWW	Short Sea	Maritime					
	ಕ	c t	7	Volume [passenger/tons]		⇒	⇒		⇒		⇒	⇒	⇒	1	⇒	⇒	⇒					
	dire	Traffic Impacts	8	Transport performance [vkm]		⇒	⇒		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒					
	Ξ	⊢ <u>E</u>	9	Transport performance [pkm/tkm]		⇒	⇒		→		⇒	⇒	⇒	<b></b>	⇒	⇒	⇒					
			10	Travel time [min]		⇒	0		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒	1				
				Travel distance [km]		⇒			+~	1	<del>                                     </del>	+-			<del>-</del>	+~	-	1				
				Out of pocket costs [EUR/vkm]	-		⇒		<del> </del>	-	<del>  _</del>	-	⇒	_	<del>  _</del>	-	<del> </del>	1				
					1	⇒	⇒		⇒		⇒	⇒	⇒	<b></b>	⇒	⇒	⇒	1				
		o £		Other cost components [EUR/vkm]		⇒	⇒		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒					
	red	Traffic Impacts		Qualitative effects (e.g. liability,)			on on ro													Sectora		
	۵	FE	15	Comments	traffic, Ceteri: which The in	, which s paribu ITS is ap itiative	leads to us, moda pplied t is abou	bette al share o. t settin	choice of the g the fr	s in terr respect amewo	ns of de ive trar rk of eff	RIPS, etc eparture nsport m ficient c timing c	time, i node mi leployn	oute ch ght onl ent of	noice. y be af innova	fected t	0	Overall	Aggricultural	Industrial	Transport	Other Services
			16	Economic growth [gdp]														⇒	⇒	⇒	⇒	→
			17	Employment [#employed]														⇒	⇒	1	1	⇒
		rs (ca	18	Resources: Energy														⇒	⇒	<b>⇒</b>	0	⇒
	Direct Economical	pac		Resources: Material														⇒	⇒	⇒	⇒	⇒
	۵	를 트		Other	Cooke f	ior bool	th cons		incuran		dooros		lomont	ation o		rotion o	acto for	provide				
		_			might	not abl	e to cap	ture th	ese imp		decice	p	Tement	ationa	па орс	ration c	0313 101	provide	. гэ аррг	y. 1110 t	CKINOC	uic
				Comments No obvious impact expected.																		
	ţ.	al cts	22	Safety [#accidents/vkm, #fatalities/vkm]		⇒	⇒					⇒	⇒									
	Direction 1	Social Impacts	23	Other	Increa	se of w	ell-bein	g for re	sidents	in urba	n areas	or near	highly	pollute	d roads	apply.		]				
				Comments														1				
		<u>ta</u>	25																			
	ť	ironmen Impacts	26	(Local) air pollution [g/vkm]																		
	Direct	m g	27	Other	Reduc	ed nois	e															
		Environmental Impacts	28	Comments			s in roa wards r		port thr	ough av	oided o	ongesti	ons mig	tht be c	omper	sated b	У					
									_													
с	TPM translation				Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
		≥	29	HT Modules addressed by TPM	Χ	Х	1	1	1	X	Х											
			30	Demography	n/a	,.				, , ·	,.	1										
		ē		Economy & Resources	n/a							1										
		TPM policy levers	32	Passenger Demand			ie_weig ta_los (		fservice	<u>=)</u>												
		ğ	33	Freight Demand	p_fd_s	peed						1										
		Σ	34	Vehicle Stock	i_vs_ca	ap_tech	(tech r	elated	vehicle	capital	costs)	ĺ										
		F	35	Environment	n/a																	
				Safety	n/a																	
				Comments								ļ										
			47	References		nic Impa	ble 2.1: / cts of Tra															
					EX-POST DG TREI Evaluat the Eun Elvik R., road ac Elvik, R. measur Phan, V safety f EC FP7 r statisti ETAC Eu Maids, powere Action r intelling Trace - of the S	et. Al. (2 F EVALUAN N A2/143 itions in t topean Re , P. Christ ccidents. . , Vaa, T. res. Let al. (2 for PTW, 2 for pean In-depth d two wiplan and ent trans eact the second second ent trans accident safety Be	l legal fr sport sys Causati nefits of	THE RSA: 2 Impa of trans ty Action A. Amun rt 740/2 he hand ler / Dri D1. eliverab nowsys ident Ca gations	AP SPECIFICAT ASSESSES PORT THE IN PROGRAM OF IN PROGRAM O	C CONTR ments a prepara n 2011-2( 04): Spee n, Norwar road saf viours ar sheets a study nts invo deploym ope	nd tion of 120 d and y ety nd road and wiving											
			48	Performed by	CADAS Database  MKmetric																	

### 1.1.15 Dynamic Traffic Management for Road (58.2)

																		_				
Section			0	Policy name Dynamic traffic management for road																		
Α			1 Policy Area 3 Research and innovation / 6. Infrastructure 2 Policy Category Research and innovation																			
			2	Policy Category	_																	
		-	3	Policy Subcategory Transport Policy Measure					systems tion of re					nforma	tion sv	stems		1				
		Ī	5	Main Targets					ices rela								nent					
									be bette								mation)	)				
									inated, a over a wi								The					
									ffic info													
									nd the t													
					(58.3).																	
			6	White Paper Reference 2. Innovating for the future: technology and behaviour 2.1 A European Transport Research and Innovation Policy																		
				2.1 A European Transport Research and Innovation Policy Initiative 25: An innovation and deployment strategy																		
										-,		01						1				
В							Pass	enger						Freight	:							
							Ê		+				Ê			_						
					Rail	Road (Urban)	Road n-Urba	Ąi	Public	Slow Modes	Rail	Road (Urban)	Road n-Urba	Air	WW	t Sea	time					
					25	× 2	Road (Non-Urban)	<	Public Transport	Sk	52	~ 듯	Road (Non-Urban)	⋖	≥	Short Sea	Maritime					
					<u> </u>		_											1				
	ic	g:		Volume [passenger/tons]		⇒	⇒		⇒		<b>↑</b>	⇒	⇒	⇒	⇒	⇒	⇒					
	Indirect Traffic	npa	8	Transport performance [vkm]		⇒	⇒		⇒		<b>†</b>	⇒	⇒	⇒	⇒	⇒	⇒					
	4	=	9	Transport performance [pkm/tkm]		⇒	⇒		⇒		1	⇒	⇒	⇒	⇒	⇒	⇒					
			10	Travel time [min]		⇒	0		⇒		1	⇒	⇒	⇒	<b></b>	⇒	⇒					
		ľ	11	Travel distance [km]	1	⇒	⇒						⇒									
		İ	12	Out of pocket costs [EUR/vkm]	1	⇒	⇒		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒					
		ľ	13	Other cost components [EUR/vkm]	1	⇒	⇒		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒	1				
	# .º	. s	14	Qualitative effects (e.g. liability,)	Less co			accider	ts on roa	ad, incre										Sectora	ī	
	Direct Traffic	прак																<u>L</u>				
		=	15	Comments					Manage					ing, co	ordinat	ed met	ering,	1	l			
		l							as a dire					ght on!	v ha af	ferted *	0	=	tura	rial	)ort	F 8
						Ceteris paribus, modal share of the respective transport mode might only be affected to which ITS is applied to.												Overall	Aggricultural	Industrial	Transport	Other Services
						which It's is applied to.  The initiative is about setting the framework of efficient deployment of innovation in all modes. The effects depend on the extent and the timing of the actual deployment.												0	Aggr	ŭ	Ĕ	S. S.
					modes	s. The e	ffects d	epend	on the e	xtent a	nd the	timing	of the a	ctual de	ploym	ent.						
				Economic growth [gdp]												⇒	⇒	⇒	⇒	⇒		
	_	.		Employment [#employed]														⇒	⇒	⇒	<b>↑</b>	⇒
	Direct Economical	gcts		Resources: Energy														⇒	⇒	<b>↑</b>	0	⇒
	Dire	μ	19	Resources: Material														⇒	⇒	1	<b>↑</b>	⇒
	ä	-	20	Other					insuran		decrea	ise. Imp	lement	ation a	nd ope	ration o	osts fo	r provide	ers appl	y. The E	CR mod	dule
		ŀ	might not able to capture these impact.  21 Comments No obvious impact expected.																			
		10		Safety [#accidents/vkm, #fatalities/vkm	_	VIOUS III	N N	xpecte	<u> </u>			8	<b>8</b>									
	Direct Social	Impacts		Other		_		og for r	sidents	in urba	n aroac			polluto	d road	annly	<u> </u>					
	ig S	8 €	23		iliciea		en-pen							ponute	u i uau	appiy.						
			24	Comments					.siuciits	III ui ba		Oi iicui	67					1				
	_		24 25	Comments GHG emissions [g/vkm]					Jacines	iii ui ba		or near	57									
	t ental		25						Jacines	III UI Da			57									
	Jire ct onmental		25 26	GHG emissions [g/vkm]	Reduc	ed nois			I	III ui ba		or near										
	Direct invironmental		25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm]		ed nois	e		port thro							sated b	l l					
	Direct Environmental		25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less e	ed nois	e ns in roa	id trans								sated b	ny .					
	Direct Environmental		25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less e mode	ed nois	e ns in roa	id trans								sated b	у					
		Impacts	25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less e mode	ed nois mission shift to	e ns in roa wards r	d trans	port thre	ough av	oided c					sated b	y y					
		Impacts	25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less e mode	ed nois mission shift to	e ns in roa wards r	d trans	port thre	ough av	oided c					isated b	у					
С		Impacts	25 26 27	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less e	ed nois	e ns in roa wards r	d trans	port thre							sated b	у					
C	Direct TPM translation Environmental	Impacts	25 26 27 28	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other	Less el mode	ed nois mission shift to	e ss in roa wards r	Freight Demand	Vehide Stock	Environment and all all and all and all and all and all and all and all and all and all all and all and all and all and all and all and all and all all and all all and all and all and all all and all all and all all all and all all and all all all all and all all all all all all all all all al	Safety					isated b	у					
С	M translation	Impacts	25 26 27 28	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other Comments	Less e mode	ed nois mission shift to	e ns in roa wards r	d trans	Vehide Stock	Environment and all all and all and all and all and all and all and all and all and all all and all and all and all and all and all and all and all all and all all and all and all and all all and all all and all all all and all all and all all all all and all all all all all all all all all al	oided c					isated b	y					
С	TPM translation	Impacts	25 26 27 28 29 30 31	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources	Less el mode  X  n/a  n/a	Economy & Resources & X	e ss in roa wards r	d trans	Vehide Stock	Environment and all all and all and all and all and all and all and all and all and all all and all and all and all and all and all and all and all all and all all and all and all and all all and all all and all all all and all all and all all all all and all all all all all all all all all al	Safety					isated b	y					
С	TPM translation	Impacts	25 26 27 28 29 30 31	GHG emissions [g/vkm] (Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography	Less el mode  Who are a composition of the composit	ed nois mission shift to  George  Wesonices  Wesonices	e ss in roa wards r Demand Personal Per	d transocial Leight	vehicle Stock	X Environment	Safety					isated b	у					
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### 1.1.16 Intelligent Road Vehicles (58.3)

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_				Policy Category		rch and			o. mma.	structur	-											
				Policy Subcategory					systems	, mana	gement	and se	rvice									
				Transport Policy Measure								nageme										
			5	Main Targets								nt road TTI - rea										
												ise of tr					ilationj					
					Inform	ation S	ystems	(ITS) co	ver a w	ide fiel	d with	three m	ain stre	ams to	be cons	sidered						
												ns (58.1										
					traffic	manage	emen (5	8.2), ar	na tne ti	nira inte	elligeni	vehicle	is, inclu	aing ar	ver ass	istence	(58.3).					
			6	White Paper Reference	2. Inno	vating	for the 1	future:	technol	logy and	d behav	iour						1				
									search a													
					Initiati	ve 25: A	n inno	vation a	and dep	loymen	t strate	gy										
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В							Pass	enger					_	Freight								
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			7	Volume [passenger/tons]		⇒	⇒		⇒		⇒	⇒	⇒	<b></b>	<b></b>	⇒	⇒					
	Indirect	acts	8	Transport performance [vkm]	+	⇒	⇒		⇒		⇒	⇒	⇒	<b></b>	1	⇒	⇒					
	la L	Ē		Transport performance [pkm/tkm]		⇒	⇒		⇒		⇒	⇒	⇒	→	1	⇒	⇒					
				Travel time [min]		_					_											
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	Direct	pact	14	Qualitative effects (e.g. liability,) Comments								omfort , coope			conne	rted dri	ving			Sectora		
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						ITS is ap			g the fra	amewo	rk of ef	ficient c	leplovn	ent of	innovat	tion in a	Ш	0	Agg	Ĕ	Ĕ	, %
	l											timing						1	1			
			16	Economic growth [gdp]														→	→	→	⇒	→
	l		_	Employment [#employed]														⇒	⇒	<b>→</b>	<b>→</b>	⇒
	Direct	13	18	Resources: Energy														⇒	→	1	0	<b>→</b>
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				Comments		vious in	npact ex	pected	1.			,										
	<u>ئ</u> ا	ggs		Safety [#accidents/vkm, #fatalities/vkn		0	₩					9	₩									
	Direct	ig III		Other	Increa	se of w	ell-bein	g for re	sidents	in urba	n areas	or near	highly	pollute	d roads							
				Comments GHG emissions [g/vkm]																		
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			34	Vehicle Stock	i_vs_c	ap_tech	(tech n	elated	vehicle	capital	costs)	j										
				Environment	n/a																	
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					DG TRE	N A2/143	-2007 Lot	t 2 Impa	ct Assess	ments a	nd											
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### 1.1.17 Replacement of Inefficient Cars (63.1)

Section			Policy name	Replac	ement	of ineff	icient c	ars									1				
A		_	1 Policy Area			d innov															
			Policy Category			ndards a		king m	easures								1				
			Policy Subcategory			on and i															
		4	Transport Policy Measure	The po	licy is s	et in or	der to s	timulat	e the re	placen	nent of i	nefficie	nt and	polluti	ng vehi	cles					
				in the	Europe	an car v	ehicle f	leet.													
			Main Targets								ensport										
		6	White Paper Reference							, i.e. m	easures	to pror	note in	creased	d replac	ement					
				rate of	ineffic	ient and	pollut	ing veh	icles								_				
_		_															-				
В						Pass	enger						Freigh	t							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	wwi	Short Sea	Maritime					
		7	Volume [passenger/tons]																		
	Indirect Traffic Impacts	-	Transport performance [vkm]	⇒	0	0		⇒	⇒								1				
	Indi Tra Imp		Transport performance [pkm/tkm]	-				<del>                                     </del>	_								-				
					⇒	⇒		⇒	⇒								1				
		10	Travel time [min]		L_		L_	L_	L_	L_		L_	L_	L_	L	L					
		11	Travel distance [km]																		
	15	12	Out of pocket costs [EUR/vkm]		n	7											İ				
	Direct Traffic Impacts	_	Other cost components [EUR/vkm]	<b>†</b>	Ť	Ť									1		1				
	ᄪᄪ	_		1	L	L	<u> </u>	<u> </u>	L	L	I	<u> </u>	<u> </u>		<u> </u>	I	1		Soctor		
			Qualitative effects (e.g. liability,) Comments	-													+-		Sectora		. s
		1.	Comments														Overall	Aggricul tural	Industri al	Transpor	Other Services
		16	Economic growth [gdp]																⇒	⇒	
	_	17	7 Employment [#employed]																-		_
	Direct Economical Impacts		B Resources: Energy																_	<b>—</b>	-
	Jire non npa	_																	⇒	⇒	
	- 8 -	_	Resources: Material																		
			Other																		
			1 Comments			Ι	1	_		ı —		ı					1				
	t = t	24	2 Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	2:	Other																		
	_ , <u>_</u>	_	4 Comments																		
	tal		GHG emissions [g/vkm]		0	0															
	ct cts		5 (Local) air pollution [g/vkm]			-															
	Direct ironmer impacts	_		-	1	0								ļ			-				
	Direct Environmental Impacts		7 Other 3 Comments														1				
	ш	20	Confinents																		
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
	ΤĒ	29	HT Modules addressed by TPM	Χ	Χ	Χ	Χ	✓	<b>√</b>	Х	1										
		_	Demography	n/a			<u> </u>	<u> </u>	<u> </u>	· /·	1										
			1 Economy & Resources	n/a							1										
	TPM policy levers	32		n/a																	
	y le		Freight Demand	n/a																	
	ollo	34	Vehicle Stock			k (fleet															
	Σ					_mkt (v															
	Ē	-	F			(vehicl					1										
			Environment Safety	n/a	mracto	or (emission and/or fuel consumption															
			7 Comments		well To	M 92 N	ew veh	icles			1										
			7 References			eebate			policy		1										
		7				uropea				esearch											
		1				Global I					1										
		1		effecti	veness	of scra	oping so	hemes	for veh	icles:	1										
		1				vironme					1										
		L			eport f	or DG Ei	ntrepris	e and I	ndustry	March											
		48	Performed by	TML	_	_	_	_	_												

### 1.1.18 Diffusion of Electro Cars (63.2)

Section		0	Policy name	Diffusi	ion of e	lectro c	ars				_						1				
A		F-1	Policy Area			d innov											1				
		-	Policy Category			ndards a		king m	easures								1				
		3	Policy Subcategory			on and i											1				
		4	Transport Policy Measure						romote	increas	ed repla	acemen	t rate o	f ineffi	cient an	nd	ĺ				
		1									elerate 1	the diffi	usion of	fvehic	es with		1				
		1				Ision in											1				
			Main Targets								m road	transpo	rt								
		6	White Paper Reference	25. An	innova	tion and	deplo	yment	strategy	'							_				
В		$\vdash$				_											1				
В						_	enger					_	Freight				-				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban	Air	wwi	Short Sea	Maritime					
	+ s	7	Volume [passenger/tons]														1				
	Indirect Traffic Impacts	8	Transport performance [vkm]	⇒	0	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>		⇒	⇒								1				
	5 ≒ €	9	Transport performance [pkm/tkm]		⇒	⇒		⇒	⇒								1				
			Travel time [min]		7	7		7	-								1				
																	4				
			Travel distance [km]																		
	ਸ਼ੂਦੂ ਇ		Out of pocket costs [EUR/vkm]		1	1			<u> </u>												
	Direct Traffic Impacts		Other cost components [EUR/vkm]																		
			Qualitative effects (e.g. liability,)																Sectora		
		15	Comments														Overall	Aggricul tural	Industri al	Transport	Other Services
		16	Economic growth [gdp]																⇒	⇒	
	<del>-</del>	17	Employment [#employed]																		
	Direct Economical Impacts	18	Resources: Energy																⇒	⇒	
	ig Si M	19	Resources: Material																	Ť	
	ш	20	Other															!			
			Comments																		
	s	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts																				
	ig S E		Other														4				
	-		Comments GHG emissions [g/vkm]				l		1		I	1	l		ı —		-				
	Direct Environmental Impacts				0	0											_				
	onm onm		(Local) air pollution [g/vkm]		9	0															
	ءَ جَ	_	Other														4				
	ū	28	Comments														_				
С	PM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
	Ē	29	HT Modules addressed by TPM	Х	Х	Χ	Х	<b>√</b>	1	Х											
		30	Demography	n/a				<u> </u>	<u> </u>		1										
		-	Economy & Resources	n/a																	
	vers		Passenger Demand	n/a																	
	Ye		Freight Demand	n/a  i_vs_veh_stock (fleet portfolio), i_vs_cap_rpcs_mkt (vehicle price with VAT), i_vs_cap_tech (vehicle capital costs)  i_ev_emfactor (emission and/or fuel consumption																	
	TPM policy levers	34	Vehicle Stock																		
	[	35	Environment	i_ev_e	mfacto	r (emiss	ion and	d/or fu	el consu	mption	n										
		36		n/a							1										
		37				M 51 N		ls.			1										
			References		fact sh	eet no.	50.				1										
		48	Performed by	TML							J										

## 1.1.19 Diffusion of $H_2$ Fuel Cell Cars (63.3)

Section		0	Policy name	Diffusi	on of H	2 fuel o	ell cars										1				
Α		1	Policy Area	3 Rese	arch an	d innov	ation														
		2	Policy Category	Efficie	ncy star	ndards a	nd flan	king m	easures												
		3	Policy Subcategory	3.2.2 P	romoti	on and i	ncentiv	es .													
		4	Transport Policy Measure								ed repla										
									in order	to stin	nulate th	ne diffu	sion of	H2 fuel	cell ve	hicles					
				in the	Europe	an car v	ehicle f	leet.													
			Main Targets														ļ				
		6	White Paper Reference	25. An	innova	tion and	deploy	yment:	trategy												
_		Н																			
В						Pass	enger						Freight								
					_	an)		t			_	an)			g,	a					
				Rail	bad	Road n-Urb	Air	blic	Slow Modes	Rail	bad	Road n-Urb	Air	W	t Se	Ē					
				~	Road (Urban)	Road (Non-Urban)	_	Public Transport	ΣŠ	~	Road (Urban)	Road (Non-Urban)	1	≥	Short Sea	Maritime					
						٤						۷			- '						
	ಕಂಚ	7	Volume [passenger/tons]																		
	Indirect Traffic Impacts	8	Transport performance [vkm]	⇒	0	0		⇒	⇒												
	<u> </u>	9	Transport performance [pkm/tkm]		⇒	⇒		⇒	⇒												
		10	Travel time [min]		Ť	Ė		Ė	Ė								1				
			Travel distance [km]	-					-								-				
			· · ·	<b> </b>	<u> </u>	-	ļ	<u> </u>	<b>_</b>					ļ			-				
			Out of pocket costs [EUR/vkm]		1	n															
	iti it	13	Other cost components [EUR/vkm]																		
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)																Sectora		
	-	15	Comments															<u>a</u>	_	+	1 1
																	Overall	Aggricultural	Industrial	Transport	Other Services
																	Š	grici	npu	lan la	Se of
																		Ag	_	-	
		16	Economic growth [gdp]																<b>↑</b>		
	<del>-</del>	17	Employment [#employed]																		
	Direct Economical Impacts	18	Resources: Energy																⇒	⇒	
	n Dire		Resources: Material																_	_	$\vdash$
	<u>a</u> –																				-
			Other Comments																		
			Safety [#accidents/vkm, #fatalities/vkm]					T T	1						1		1				$\overline{}$
	Direct Social Impacts	22	Sarcty (#accidents) vkiii, #iatairaes) vkiiij																		
	Dire Poci	23	Other														ĺ				
			Comments																		
	ıtal	25	GHG emissions [g/vkm]		0	0															
	ads are	26	(Local) air pollution [g/vkm]		⇒	⇒															
	Direct ironmer Impacts		Other																		
	Direct Environmental Impacts	-	Comments																		
		Т																			
	r.			hγ	ω v	_			'n												
	<u>at</u>			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	εtγ											
	ans			mog	ono	asse Dem	Frei	Vehide Stock	ioi	Safety											
С	TPM translation			Del	5 ×	2 -	_	_	Ë												
	₽	29	HT Modules addressed by TPM	Χ	Χ	Χ	Χ	✓	Χ	Χ											
		30	Demography	n/a							1										
			Economy & Resources	n/a																	
	/ers		Passenger Demand	n/a																	
	TPM policy levers		Freight Demand	n/a																	
	olic	34	Vehicle Stock			k (fleet															
	Σ					_mkt (v (vehicl			th VAT)	,	1										
	₽	Ы	-								1										
			Environment Safety		mtacto	r (emiss	ion and	or fue	l consu	mption	1										
			Comments	n/a	well Tr	M 51 N	aw Fuc	le			1										
			References			eet no.		13.			1										
			Performed by	TML							1										
		_					_														

## 1.1.20 LDV Speed Limit (78)

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Section A				Policy name		eed lin												-				
•				Policy Area Policy Category				s and fla and flar										-				
				Policy Subcategory				y standa														
			4	Transport Policy Measure								of light										
						to decr	ease en	ergy co	nsumpt	ion, to	enhanc	e road s	safety a	nd to e	nsure a	level pl	aying					
			5	Main Targets	field.	ve safe	tv. derr	ease en	ergy co	nsumnt	tion and	densure	e level :	olavinø	field.			+				
		ı		White Paper Reference				future:						31071116	iicia.			1				
								sustaina														
					Initiat	ive 30: I	co-driv	ing and	Speed	limits												
																		_				
В							Pass	enger						Freigh	t							
						-	)au		ដ	S		-	)au)			es	e e					
					Rail	Road (Urban)	Road	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road n-Urb	ξ	WM	Short Sea	Maritime					
					_	<sub>∞</sub> ∋	Road Non-Urban		Tra P	ν Σ	_	" ⊇	Road Non-Urban)		_	Sho	Σ					
			7	Volume [passenger/tons]			_				١.	-	Ť				-	-				
	Indirect Traffic	acts		Transport performance [vkm]							<b>→</b>	7	⇒			<u> </u>	-	-				
	Traf	ğu .						ļ			⇒	7	⇒					↓				
				Transport performance [pkm/tkm]							⇒	0	⇒									
			10	Travel time [min]								1						J				
			11	Travel distance [km]								7										
		Ţ	12	Out of pocket costs [EUR/vkm]			1					1						1				
	1	ļ	13	Other cost components [EUR/vkm]			t					Ė					1	1				
	埬윤	ğ	14	Qualitative effects (e.g. liability,)		1	1	1	<b></b>	ı	1			-	1		1			Sectora		
	Direct Traffic	mpa		Comments	This po	olicy wi	II main	y affect	urban 1	freight	transpo	rt; the I	LDV wil	be use	d in the	city an	d for	1				
		-			transp	ortatio	n from	and to t	ne city.	This co	uld incr	ease th	e trave	lled dis	tance ar	nd		1	<u>10</u>	_	+	
											uel cos	ts migh	t decre	ase hov	vever lo	nger tra	avel	=	븊	tria	ğ	ices
		l						r costs, f			ort o	oves-	d to L	mar-1	al for	tor =	al	Overall	Aggricultural	Industrial	Transport	Other Services
		l						passeng entrate				expecte	u to be	ınargir	al tor in	iter zon	al	1	AB	-	-	"
	ļ			Francisco C. C. C.	Same	v w		- mate	-vicii i iL		-c rigill	.uncs.				1		₩	<u> </u>	├		-
	1	ļ		Economic growth [gdp]															<u> </u>	<u> </u>	<u> </u>	ļ
	Direct Economical	'n		Employment [#employed]																		
	rect	bact		Resources: Energy																		
	ig ö	Ξ	19	Resources: Material														0			0	
			20	Other																		
			-	Comments																		
			22	Safety [#accidents/vkm, #fatalities/vkm]		1			⇒	1		1										
			23	Other		•			•		•					•		1				
	<b>ਚ</b> ਜ਼	ts	24	Comments	Cnood	of LDV	offooto	in the f	iret ala	o the c	of oto o	f this ca	togoni	Othor	nato a o vi	00/000		-				
	Direct Social	mpa	24	Comments								fit from										
		-																				
										iaiis (ai	nd prob	ably cyc	lists as	well), v	ve aiiii i	.o mciui	ac suci	1				
									other m	odes, t	his effe	ect is mo						1				
								OL. For he HIGH	other m	odes, t	his effe	ect is mo										
	enta	9	25	GHG emissions [g/vkm]					other m	odes, t	his effe	ect is mo										
	rect nmenta I	pacts		GHG emissions [g/vkm] (Local) air pollution [g/vkm]		ling sco			other m	odes, t	his effe	ect is mo										
	Direct wironmenta I	Impacts	26			ling sco			other m	odes, t	his effe	ect is mo										
	Direct Environmenta I	Impacts	26	(Local) air pollution [g/vkm]		ling sco			other m	odes, t	his effe	ect is mo										
	Direct Environmenta I	Impacts	26 27	(Local) air pollution [g/vkm] Other	model	ling sco			other m	odes, t	his effe	ect is mo										
		Impacts	26 27	(Local) air pollution [g/vkm] Other	model	ling sco	ppe of t	he HIGH	other m	odes, t	his effe nodule	ect is mo										
		Impacts	26 27	(Local) air pollution [g/vkm] Other	model	ling sco	ppe of t	he HIGH	other m	odes, t	his effe nodule	ect is mo										
<b>C</b>		Impacts	26 27	(Local) air pollution [g/vkm] Other	model	ling sco	ppe of t	he HIGH	other m	odes, t	his effe	ect is mo										
С		Impacts	26 27 28	(Local) air pollution [g/vkm] Other Comments	Demography	Economy & Resources	Passenger Demand	he HIGH	Vehicle Stock	Environment	Safety Safety	ect is mo										
С	Direct Environmenta	Impacts	26 27 28 29	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM	X Demography	ling sco	ppe of t	he HIGH	other m	odes, t	his effe nodule	ect is mo										
С	TPM translation	Impacts	26 27 28 29 30	(Local) air pollution [g/vkm]  Other  Comments  HT Modules addressed by TPM  Demography	a Demography	Economy & Resources	Passenger Demand	he HIGH	Vehicle Stock	Environment	Safety Safety	ect is mo										
С	TPM translation	Impacts	26 27 28 29 30 31	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources	model X Demography	Economy & Resources	Passenger Demand	he HIGH	Vehicle Stock	Environment	Safety Safety	ect is mo										
С	TPM translation	Impacts	26 27 28 29 30 31 32	(Local) air pollution [g/vkm]  Other  Comments  HT Modules addressed by TPM  Demography	model X n/a n/a n/a	Economy & Resources	Passenger X	he HIGH	Stock Stock	Euvironment	Safety Safety	ect is mo										
С	TPM translation	Impacts	26 27 28 29 30 31 32 33	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand	model X n/a n/a n/a	Economy & Resources	Passenger X	Freight Demand	Stock Stock	Euvironment	Safety Safety	ect is mo										
С		Impacts	26 27 28 29 30 31 32 33 34 35	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment	model  Man/a  N/a  n/a  n/a  p_fd_c	Economy & Resources	Passenger X	Freight Demand	Stock Stock	Euvironment	Safety Safety	ect is mo										
С	TPM translation	Impacts	29 30 31 32 33 34 35 36	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety	Audeudoduado N/a n/a n/a n/a n/a n/a i_sa_s	Economy & X	Demand X	he HIGH  Leight  Demand	Achicle X	Euvironment X	his effection of the state of t	ect is mo										
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С	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Xn/a n/a n/a n/a n/a chang (urban	Economy & X	December of the state of the st	p_dist (	o intra-	tual tual tual tual tual tual tual tual	his effection of the second of	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety	Aude Boomad  X n/a n/a n/a n/a n/a n/a c Chang (urbar Logghi	X Expeed, i	Jaguera de la composición del composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la	p_dist (	all young to intra-rekenintra-	tumuu numuu tuu t	his effection of the second of	U U										
C	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	X n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a	Economy & Speed, i	Jaguer and Land Land Land Land Land Land Land	p_dist (	all your X	tumuu ojiyuu X	his effection module  Additional module of the second module of the seco	U U										
С	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	X n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a	Economy & Speed, i	Jaguer and Land Land Land Land Land Land Land	p_dist (	all your X	tumuu ojiyuu X	his effection module  Additional module of the second module of the seco	U U										
C	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Act deside was a contract of the contract of t	speed, i	January See A X Xfd_im	p_dist ( y apply 0) - Door	al your XX XX XX XX XX XX XX XX XX XX XX XX XX	tuneur (Constitution of the Constitution of th	his effection and the second s	U U										
С	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	X n/a n/a n/a n/a n/a n/a n/a n/a n/a n/a	speed_t X  Speed_t X	pue of t	p_dist (	all young and a second and a se	tunent XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	his effection and the second s	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Model  Atdexisoomed  X  N/a  n/a  n/a  n/a  n/a  n/a  i_sa_s  Chang  (urbar  Logghi  van hek  km/uv  only  Safety  EX-PO	& Speed, i	pue of t	p_dist ( y apply 0) - Door	all young and a second and a se	tunent XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	his effection and the second s	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Midebourd  X  X  n/a  n/a  n/a  n/a  n/a  n/a  n/	espeed, i	ppe of t	p_dist (	July 2005  X  Addistance  July 2005  X  Addistance  July 2005  X  Addistance  Addistance  REPORTE  REP	tumunionionionionionionionionionionionionion	his effection of the second of	U U										
С	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Mide Labourus Air Mark Labouru	aged transported to the state of the state o	pupe of the pupe o	p_dist (	ay you's X  Ay you's X  Ay you's X  X  Ay you's X  X  X  X  X  X  X  X  X  X  X  X  X	Land Land Land Land Land Land Land Land	Adages  Atages   U U											
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	At de Book Back Arian Ar	ag speed, i	Japan De German State St	p_dist (  y apply  ) - Door  odel varens. (Ti FINAL  N OF TH	all your so intra- rekeniri de ma ML-Leuv REPORT E RSAP	tuauuoininin tuauuoinin tuutuun tuutuun tuutuun tuutuun tuutuun tuutuun tuutuun tuun tuutuu	his effection of the control of the	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Model  Active to the first term of the first ter	eg sould on a sould on	Japanese and American State of the State of	p_dist (  y apply  ) - Door adel varens. (Ti  FINAL N OF TH  7 Lot 2 li  e field duropean	all young and a sound a sound and a sound a sound and a sound a so	tuamuojoudes, t t safety n saf	Alayles  Ala	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Aldebaumad  X n/a n/a n/a n/a n/a s Chang (urbar Logghi EX-PO CONTR and Ex-PO	speed, i	fd_im  fd	p_dist (  y apply  y apply  y apply  T-FINAL  N OF TH  7 Lot 2 II  e field a forogean	a) you'd a you	tunioudes, t t safety n live is a set of the safety n live is a set of the safety n live is a safety n live	Apples  Apples	U U										
C	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Aide 8800 and Aide 1 a	speed_t   Solution   S	fd_im  fd	p_dist (  y apply  ) - Door adel varens. (Ti  FINAL N OF TH  7 Lot 2 li  e field duropean	a) you'd a you	Lebel Specific Specif	Apples  Apples	U U										
C	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Aide 8800 and Aide 1 a	Repeed, i	fd_im  fd	p_dist (  y apply  y apply  y apply  T-FINAL  N OF TH  7 Lot 2 II  e field a forogean	a) you'd a you	Lebel Specific Specif	Apples  Apples	U U										
С	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Model  Adde Boolean  X  Mn/a n/a n/a n/a n/a n/a n/a n/a n/a n/a	speed, i	fd_im  fd	p_dist (  y apply  y apply  y apply  T-FINAL  N OF TH  7 Lot 2 II  e field a forogean	ay you's X  A distance to intra- rekenir de ma ML-Leuv REPORT E RSAP mpact A f trans Road S mundses	tumuu oja ja ja ja ja ja ja ja ja ja ja ja ja j	Alayes	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Addes Book and Addes Add	peed to cook of the cook of th	Jaban Puese and Jaban Ja	p_dist (  y apply:  y apply:  FINAL N OF TH 7 Lot 2 li e field auropean en, A. A leints. Ti	a your so intra- rekenina MIL-Leux REPORTI E RSAP mpact A aff trans S Road S mundsed I repoint	tumunojanu Jumunojanu	Approximate the second of the	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Model  Added Book and American	Sippeed, i		p_dist (  y apply  y apply  y apply  y apply  y apply  The lefted a deliver. The lefted	agua y y y y y y y y y y y y y y y y y y y	tumuu oja ja ja ja ja ja ja ja ja ja ja ja ja j	Alayer  Alayer	U U										
C	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Acres Sector Safety Rosa Sector Safety Rosa Sector Safety Rosa Sector Safety Rosa Sector Safety Rosa S	a Suppeed, i	Jab pur Habitata Alaman	pulled by apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  A deliv:  safetyk	all young and a second and a se	tuamuu ojaa ja ja ja ja ja ja ja ja ja ja ja ja	his effection of the control of the	U U										
c	TPM translation	Impacts	29 30 31 32 33 34 35 36 37	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Addes Book and Addes Add	peed to ceed, i	ppe of the power o	p_dist (  y apply  y apply  y apply  y apply  y apply  The lefted a deliver. The lefted	all young and a second and a se	tuamuu ojaa ja ja ja ja ja ja ja ja ja ja ja ja	his effection of the control of the	U U										
c	TPM translation	Impacts	229 330 31 332 333 34 35 36 37 47	(Local) air pollution [g/vkm] Other Comments  HT Modules addressed by TPM Demography Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	Addes Book and Addes Book and Addes Book and Addes Book and Addes Book and	a Suppeed, i	ppe of the power o	pulled by apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  y apply:  A deliv:  safetyk	all young and a second and a se	tuamuu ojaa ja ja ja ja ja ja ja ja ja ja ja ja	his effection of the control of the	U U										

## 1.1.21 Urban Road Charging (81)

Section		(	Policy name	Urban	road ch	arging									-						
A		_	Policy Area	1 Prici	ng												1				
		2	Policy Category	Pricing	3												]				
		3	Policy Subcategory	1.1 Inf	rastruct	ure cha	rging /	access r	estricti	ons sch	emes						]				
		4	Transport Policy Measure	Urban	Area ch	arging ,	/ Cordo	n pricin	g												
		5	Main Targets								r chargi						1				
											ted ope	rationa	and te	chnical	framev	vork					
		_	and to D. C.					ucture	• •								4				
		- 6	White Paper Reference		ovating i egrated			technol	ogy and	behav	lour										
									rhan ro	ad user	chargin	σ									
		-		merae	VC 52.7	20		1111011		Ja asc.	chargin	ь									
В		П				Dacc	enger		-				Freight				1				
						_	ligei					_	rieigiii	_			1				
					_ <del>_</del>	Road (Non-Urban)		ي ل	~ s		_ <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del> <del>_</del>	Road (Non-Urban)		_	ea ea	æ					
				Rail	Road (Urban)	Road n-Urb	Ą	Public Transport	Slow	Rail	Road (Urban)	Road in-Urb	Α̈́	WW	Short Sea	Maritime					
					1 5	, S		a F	0, ≥		F 5	No		_	Sh	ž					
		۲.	Volume [passenger/tons]					<b>-</b>	-								1				
	ic is	_				9		1	1			→									
	Indirect Traffic Impacts	8	Transport performance [vkm]			9		1	1			⇒									
	5-5	9	Transport performance [pkm/tkm]			0		1	1			1									
		10	Travel time [min]														1				
		11	Travel distance [km]														1				
		_		<b> </b>		<u> </u>	<del>                                     </del>	1	<u> </u>	<b> </b>		<u> </u>		<u> </u>		-	-				
		_	Out of pocket costs [EUR/vkm]	<u> </u>	<u> </u>	n	<u> </u>	⇒		<u> </u>		1					4				
	Direct Traffic Impacts	_	Other cost components [EUR/vkm]																		
	直급		Qualitative effects (e.g. liability,)																Sectora		
		15	Comments	Ī													1_	ıral	-B	ţ	
		1		l													Overall	Aggricultural	Industrial	Transport	Other Services
		Ì		ĺ													ŏ	gric	ngu,	Tran	Sen
		<u> </u>																			
		_	Economic growth [gdp]														⇒	⇒	⇒	7	⇒
	s a		Employment [#employed]														⇒	⇒	⇒	9	⇒
	Direct Economical Impacts	18	Resources: Energy														⇒			8	
		19	Resources: Material																		
	ш	20	Other																		-
		21	Comments																		
	4 - B	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	23	Other														1				
	_ ~ E		Comments	Road s	afety is	not ne	cessaril	y impro	ving as	the tra	vel spe	ds are	ikely to	increa	se.		1				
	rta		GHG emissions [g/vkm]														1				
	t a t		(Local) air pollution [g/vkm]														1				
	Direct ironme I																-				
	Direct Environmenta I Impacts	27	Comments														+				
		-20	Commens																		
	Ē			ج.	ω ω	_			ŧ		Ī										
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	iţ.											
	ansl			Jo C	ono	asse Dem	Freign	/ehicle Stock	io i	Safety											
С	S ţ			Der	8 %	<u>8</u>	- 4	_	Ē												
	Ē	29	HT Modules addressed by TPM	Χ	Χ	<b>√</b>	<b>√</b>	Χ	Χ	Χ											
		30	Demography	n/a						-	1										
	۳		Economy & Resources	n/a																	
	eve	32	Passenger Demand	i_pd_u	ırban_d	utoll															
	2	33	Freight Demand	p_fd_l	oad_fac	tor, p_t	fd_spee	ed (intra	-zonal)	,											
	TPM policy levers				oll_cost																
	Σ	-	Vehicle Stock	n/a							ļ										
	-		Environment	n/a																	
		_	Safety	n/a	11				-11.41		1										
		37	Comments					cenario													
					areas, e		oution (	entres	outside	OI											
							emes f	or urbar	areas	could											
								e fuel te													
								ged on I													
								the use	e of UC	Cs and											
					ore dec																
								es could													
						sion zoi	nes, lov	v-noise	windov	vs for											
				trucks		ation of	tho no	lievien													
		Ì						licy is no sure: in													
								dd only													
								schem													
		1						d there			1										
		Ì					ors, inc	rease in	kms tra	velled	1										
		L		and tra	evel tim	es					]										
		47	References					ssment		Social											
		1						nsport f		12)	1										
		L			nes, Fac	ı əneet	. ı (Kriti	zinger e	ı di., 20	13].	1										
		48	Performed by	KIT							J										

## 1.1.22 HDV Limitation for Urban Areas (83)

Section		0	Policy name	HDV li	mitatio	n for url	oan are	as									1				
Α		1	Policy Area	7 Trans	sport Pl	anning															
			Policy Category			ndards a			easures												
			Policy Subcategory			gistics s															
		4	Transport Policy Measure									ing urba									
												of heav									
				_	ng mea				,			,				-					
		5	Main Targets	The ac	tivation	of this	measu	re corre	sponds	to the	implem	entatio	n of an	increm	ent		ĺ				
												factor of									
												ner as tl dominar									
		_	ud v o o f						-			JOHIHA	itiy use	eu.							
		ь	White Paper Reference			for the f urban i			ogy and	benav	iour										
						near- 'z			urban lo	gistics'	2030										
		E																			
В							enger						Freight	t			<u> </u>				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	wwi	Short Sea	Maritime					
	# 0 N	7	Volume [passenger/tons]														Ī				
	Indirect Traffic Impacts	8	Transport performance [vkm]								ı			1			1				
	로부트	9	Transport performance [pkm/tkm]								ı						1				
			Travel time [min]								-			1			1				
			Travel distance [km]		7			0			0			-			-				
			` '																		
			Out of pocket costs [EUR/vkm]																		
	cts	13	Other cost components [EUR/vkm]								0										
	Direct Traffic Impacts		Qualitative effects (e.g. liability,)								•								Sectora		
		15	Comments															<u>.e</u>	_	-	
																	Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]														1			1	
	<del>-</del>	17	Employment [#employed]																		
	Direct Economical Impacts	18	Resources: Energy																		
	Dir Ono Imp	19	Resources: Material																		
	ы	_	Other														l	l			
		_	Comments																		
	10	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts																				
	ig S m	-	Other																		
			Comments GHG emissions [g/vkm]																		
	t ent																				
	Direct ironmen Impacts	_	(Local) air pollution [g/vkm]														ļ				
	Direct Environmental Impacts		Other																		
	Ξ.	28	Comments																		
	ion			phy	% sa	Ja. p	, p	41	ent												
	PM translation	1		Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
С	tra	1		Jem J	Eco	Pas	ات ۾	آ خ	ivi	Š											
	2 €	20	HT Modules addressed by TPM				/	/													
						Χ	V	V													
	ys		Demography Economy & Resources	n/a n/a																	
	ever		Passenger Demand	n/a																	
	TPM policy levers	33	Freight Demand	p_fd_l		tor (for															
	poli	34	Vehicle Stock			t_othr			l opera	tional											
	μ	-	F!		or freig	ht road	transpo	ort)													
	_		Environment Safety	n/a n/a																	
			Comments	11/ d																	
				ACCICT							1										
		4/	References	A33I3I	ract sn	eet no.	47.														
			Performed by	KIT	ract sn	eet no.	47.														

## 1.1.23 Replacement of Inefficient LDVs and Buses (84)

Section		0	Policy name	Replac	ement	of ineff	icient L	DVs and	d buses												
		1	Policy Area			andards	and fla	nking r	neasure	es/											
Α					port pl																
		_	Policy Category Policy Subcategory			ndards a															
		3	Policy Subcategory			gistics s			gue												
		4	Transport Policy Measure					purcha	sing cle	an and	energy	-efficie	nt com	mercial	vehicle	s (LDV					
		_				urban le						- C									
		5	Main Targets									s. The fi in the l									
				band.	The sec	ond cha	nge is a	n incre	ase of t	he shar	e of ele	ctric LD	V which	h will be							
						or an ba						on estim	nating t	he prob	ability						
		- 6	White Paper Reference									·'zero-e	mission	urhan	Ingistic	c' 2030					
		Ľ	Willite Faper Neterence	2.3. 111	cgrate	a di baii		.y, i.c. (	33/14 311	ategy i	or near	2010 0		- urbuii	- IOSISTIC	.5 2050					
В						Docc							Freight								
							enger						rieigii								
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WWI	Short Sea	Maritime					
		7	Volume [passenger/tons]	1	<i>8</i>						<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>										
	Indirect Traffic Impacts		Transport performance [vkm]	1		-				-							1				
	Indi Tra Imp		Transport performance [pkm/tkm]	7	7		-			1	7										
			Travel time [min]	1	0						9										
			Travel distance [km]	-	-	-		-													
			Out of pocket costs [EUR/vkm]		2						2										
	# in #		Other cost components [EUR/vkm]		1						1										
	Direct Traffic Impacts		Qualitative effects (e.g. liability,)																Sectoral	1	
	=		Comments															1 .			
																	Overall	Aggricultur al	Industrial	Transport	Other Services
		16	Economic growth [gdp]																#	⇒	
	<u> 7</u>	17	Employment [#employed]																		
	Direct Economical Impacts	18	Resources: Energy																	⇒	
	Di Econ Im	19	Resources: Material																		
	_		Other		•	•		•	•			•						•			
		_	Comments Safety [#accidents/vkm, #fatalities/vkm]			1		1		1				1			1				
	ial acts	22	Safety [#accidents/vkiii, #ratailties/vkiii]																		
	Direct Social Impacts	23	Other					!	!												
		_	Comments							1											
	Direct Environmental Impacts		GHG emissions [g/vkm]		⇒						⇒										
	Direct ironmen Impacts		(Local) air pollution [g/vkm]		7						7										
	invin	_	Other Comments																		
		20	comments																		
	L.			γ	a v	<u>.                                    </u>			t												
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
_	trans			emo	Reso	Pass	Fre	Vel St	viro	Sat											
С	ΜĀ	20	HT Modules addressed by TPM				,	<u> </u>		.,											
	-	_	·	Х	✓	Χ	✓	✓	✓	Χ											
			Demography Economy & Resources	n/a ierd	elta_in	,															
			Passenger Demand	n/a		-															
	vers	33	Freight Demand			tor (int	ra-zona	I),													
	icy le	2/	Vehicle Stock		oad_cap	pacity _mkt (v	obiclo r	rico wi	+h \/ A T\												
	lod	34	venice stock			(techn															
	TPM policy levers			costs)																	
		35	Environment			rs (emis		d/or fu	el												
		36	Safety	consur n/a	nption	factors)					-										
			Comments	, a																	
		47	References		fact sh	et no. 4	6.														
		48	Performed by	TML																	

## 1.1.24 Acceleration of TEN-T Implementation (86)

Section		0	Policy name	Accela	ration o	of TEN-	Γimple	mentati	on												
A		1	Policy Area	6 Infra	structu	re											1				
			Policy Category	Intern	al mark	et											]				
			Policy Subcategory			TEN-T c											4				
		4	Transport Policy Measure	assum	ptions 1	that the	Core T		vork wi	l be co	ion of T mplete										
		5	Main Targets								ly a pred zones w										
		6	White Paper Reference														j				
		_																			
В						Pass	enger						Freight	t			_				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WWI	Short Sea	Maritime					
	# 0.8	7	Volume [passenger/tons]														Ì				
	Indirect Traffic Impacts	8	Transport performance [vkm]	1		1				n		1		1			1				
	<u> </u>	9	Transport performance [pkm/tkm]	7		1				7		1		1			1				
		10	Travel time [min]	7		<i>y</i>				<i>»</i>		<i>y</i>		7			1				
			Travel distance [km]	7		7	1	1		⇒	1	⇒		⇒			+				
			Out of pocket costs [EUR/vkm]	<i>"</i>	-	11	1			_	1	-		-	1		1				
		-	Other cost components [EUR/vkm]				<del>                                     </del>	<del> </del>			-			١.	1		1				
	Direct Traffic Impacts				ļ	<u> </u>	<u> </u>	<u> </u>	<u> </u>	9	<u> </u>	0		0	<u> </u>	<u> </u>	}		Fast		
	ig Tra		Qualitative effects (e.g. liability,) Comments	1													1		Sectora		
		13	comments														Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]																		
	-a	17	Employment [#employed]														1			n	
	Direct Economical Impacts	18	Resources: Energy														-			7	
	Direct conomic Impacts		Resources: Material																		
	요 _																	ļ			
			Comments																		
	Direct Social Impacts		Safety [#accidents/vkm, #fatalities/vkm]																		
	ig S g		Other														4				
			Comments GHG emissions [g/vkm]		l .	1	I	1			l .			1	1	l .	-				
	Direct Environmental Impacts																┦				
	Direct ironmer Impacts		(Local) air pollution [g/vkm]														<u> </u>				
	, š i		Other														4				
	ш	28	Comments																		
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
	ם	29	HT Modules addressed by TPM	Χ	<b>√</b>	✓	✓	<b>√</b>	Χ	Х											
		30	Demography	n/a																	
			Economy & Resources		elta_in																
	ers	32	Passenger Demand			ne, i_pd	_imp_d	ist,													
	TPM policy levers	33	Freight Demand	p_fd_s		travel ti		fd_wait	t_time,												
	Σ	34	Vehicle Stock	i_vs_n	f_rof_c	st_othr	(other	non-fue	l opera	tional											
	Ħ				or freig	ht road	transpo	ort)													
			Environment	n/a							1										
			Safety Comments	n/a TEN T	imnlen	nentati	nn is int	erprete	d hv		1										
		,	commence	_				sts thro		. TOLL											
				Cost. T	his will	affect	directly	the der	mand m	odules											
								work. T													
								demano already	. ,												
								on of e.													
		47	References			eet no.					1										
			Performed by	KIT			-														

## 1.1.25 Deployment of Efficient Vehicles (92)

Section			0	Policy name	Denlo	vment	of effici	ent veh	cles				_					l				
Α			1	Policy Area			d innov															
			2	Policy Category	Efficie	ncy sta	ndards a	and flan	king me	asures												
			3	Policy Subcategory			Technol															
			4	Transport Policy Measure Main Targets			leploym environi								t matari	al						
			6	White Paper Reference			rastruct					e or ex	isting t	тапзрог	tillateri	ai.						
				•			infrastr															
					Initiat	ive 35:	Multimo	odal frei	ght con	idors fo	or susta	inable	transpo	rt netw	orks							
В						_	D							Fordale								
ь					-	1		enger					-	Freigh								
					l _	p û	d rban	١.	lic oort	w les	_	₽ Œ	d rban		>	Sea	me					
					Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Ā	W.	Short Sea	Maritime					
						~	ž		Ξ.	_		~	ž			S	2					
	#	ts	7	Volume [passenger/tons]	⇒	⇒	<b>→</b>	⇒	⇒		<b></b>	⇒	⇒	⇒	⇒	⇒	1					
	Indirect Traffic	pact	8	Transport performance [vkm]	⇒	⇒	⇒	⇒	1		1	⇒	⇒	⇒	⇒	1	⇒					
	==	Ξ	9	Transport performance [pkm/tkm]	⇒	⇒	⇒	⇒	→		<b>→</b>	⇒	⇒	⇒	⇒	<b></b>	⇒					
			10	Travel time [min]																		
			11	Travel distance [km]																		
			12	Out of pocket costs [EUR/vkm]	0	0	0	0	0		0	0	0	0	0	0	-					
	# .2	ds	13	Other cost components [EUR/vkm]	7	7	7	7	7		7	7	7	7	7	7	7					
	Direct Traffic	mpa	14	Qualitative effects (e.g. liability,)	+~		- 7		7		7	7	7	7		7	7		_	Sectora		
		-		Comments	Margir	nal effe	cts expe	ected fo	r all mo	des aff	ected										ť	
																		Overall	Aggricultura	Industrial	Transport	Other Services
																		Š	ggric	JB.	Tran	g å
			16	Economic growth [gdp]														_		1	_	_
	_		17	Employment [#employed]														⇒	⇒	7	⇒	⇒
	nica.	acts	18	Resources: Energy														⇒	⇒	7	<b>→</b>	⇒
	Direct Economical	шb		Resources: Material														┱	⇒	⇒	⇒	⇒
	ı ü	_	20	Other														_	_	_	_	_
			21	Comments																		
	ಕ ಹ	cts	22	Safety [#accidents/vkm, #fatalities/vkm	<b>%</b>	0	0	0	0		0	0	-	9	0	0	0					
	Direct Social	mpa	23	Other		•						•			•							
			24	Comments																		
	ıta			GHG emissions [g/vkm]	7	0	0	2	0		0	-	2	0	0	9	0					
	ect	acts		(Local) air pollution [g/vkm]	0	0	0	2	9		0	2	0	9	0	9	0					
	Direct Environmental	ᇤ	27	Other	A 4= ==1	1	- 4 4 !	-6	fissi		11 -4	-166-		-1	-1-1	h 1						
	Ē		28	Comments		y pollu	etration ting.	orretri	nitting	may su	II Stron	giy arre	ctemis	sions a	oia tec	nnoigo	ies can					
	u				ηγ	∞ ×	h 7			ent												
	slati				Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environmen	Safety											
С	tran				emo	Con	Pass	F P	Vel	wire	Sa											
	TPM translation		20	HT Modules addressed by TPM	_	<u>√</u>	Х		,	ū /	<b>√</b>											
			30		X n/a	V		Χ	<b>V</b>	<b>V</b>	<b>V</b>											
			31	Demography Economy & Resources	, .	elta_rt	d															
			32	Passenger Demand	n/a																	
			33	Freight Demand	n fd I	oad fa	ctor, p_f	fd_spee	d,													
			33																			
				Vahirla Stock	p_fd_l	oad_ca		nortfol														
				Vehicle Stock	p_fd_l i_vs_v	oad_ca eh_sto	ck (fleet		io),	h VAT)	,											
			34		p_fd_l i_vs_v i_vs_c i_vs_c	oad_ca eh_sto ap_rpcs ap_tech	ck (fleet _mkt (v n (vehicl	ehicle p le capita	io), rice wi I costs)													
			34	Vehicle Stock  Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e	oad_ca eh_stor ap_rpcs ap_tech emfactor	ck (fleet _mkt (v	ehicle p le capita	io), rice wi I costs)													
			34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e factor	oad_ca eh_storap_rpcs ap_tech emfactors)	ck (fleet _mkt (v n (vehicl or (emiss	ehicle p le capita sion and	io), rice wit l costs) /or fue	l consu	mption											
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			34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e factor i_sa_s influe device	oad_ca eh_stora ap_rpcs ap_tech emfactors) peed_c nce), i_sa	ck (fleet i_mkt (v i (vehicl or (emiss ar, i_sa_ sa_distr _fatigue	ehicle ple capita sion and dui_car action_ car, i_	io), rice wir il costs) /or fue (drivin car (dist	consul g under raction raint_ca	mption (by ir (belt											
			34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e factor: i_sa_s influe device use &	oad_ca eh_stora ap_rpcs ap_tech emfactors s) peed_c nce), i_ e)), i_sa child re	ck (fleet i_mkt (v i (vehicle or (emiss ar, i_sa_ sa_distr _fatigue straints	ehicle ple capita sion and dui_car action_ e_car, i_ i), i_sa_	io), rice wir il costs) /or fue  (drivin car (dist sa_rest reh_det	g under raction raint_ca	mption (by or (belt											
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	levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e factor i_sa_s influe device use & i_sa_s influe device	oad_ca eh_sto ap_rpcs ap_tech emfacto s) peed_c nce), i_e e)), i_sa child re peed_t nce), i_ e)), i_sa	ck (fleet i_mkt (v i_mkt (v i_mkt (v i_mkt) i_sa_distr _fatigue sstraints ruck, i_s sa_distr _fatigue	ehicle ple capita sion and dui_car caction_ e_car, i_ ), i_sa_' caction_ e_truck,	io), price with costs) for fue (driving car (dist sa_rest reh_det ruck (dist truck (dist	g under raction raint_ca rect_car riving unistraction	(by ir (belt inder											
	oli cy levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_ev_e factor i_sa_s influe device use & i_sa_s influe device (belt u	oad_ca eh_stor ap_rpcs ap_tech emfactor s) peed_c nce), i_ e)), i_sa child re peed_t nce), i_ e)), i_sa ckild se peed_t nce), i_ e)), i_sa	ck (fleet i_mkt (v i_mkt (v i_mkt (v i_mkt) ar, i_sa_ sa_distr _fatigue sstraints ruck, i_s sa_distr _fatigue ild resti	ehicle ple capital sion and dui_car action_e_car, i_ ), i_sa_t action_e_truck, raints),	io), rice win costs) /or fue (drivin car (dist sa_rest ruck (di ruck (di i_sa_re	g under rraction raint_ca rect_car riving un istraction	mption (by or (belt or, nder on (by truck											
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	TPM policy levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_ev_e facton i_sa_s influe device (belt u i_sa_b i_sa_s influe device i_sa_s influe device (belt u i_sa_b	oad_ca eh_stor ap_rpcs ap_tect emfactc s) peed_c_ nce), i_ nce), i_ sockhild re peed_t, i_ linear emfactc illinear emfactc il	ck (fleet ck (fleet cmkt (v cmkt (v cmkt (vehicl cr (emiss car, i_sa_ csa_distr fatigue cstraints ruck, i_s csa_distr fatigue cid rest cot_trucl cot_trucl cot_trucl cot, i_s csa_distr fatigue ct, i_s csa_distr fatigue ct, i_sa_distr fatigue	ehicle ple capital sion and capital sion	io), rice wii costs) /or fue (drivin sa_rest seh_dei ruck (di i_sa_re eh_dei veh_dei sa_vel drivin got (distruck)	g under raction raint_ca ect_car riving und straction straction defect_ under action defect_	mption (by ir (belt ), inder on (by truck ck, der n (by t_p2w (by pt											
	TPM policy levers		34	Environment	p_fd_l i_vs_v   i_vs_c   i_vs_c   i_vs_c   i_vs_c   i_vs_c   i_vs_c   i_vs_c   i_sa_s   influe   device   i_sa_s   influe   device   i_sa_s   influe   device   i_sa_s	oad_ca eh_stor ap_rpcs ap_tect solution become in the content of the content appending t	ck (fleet ck (fleet cmkt (ve cmkt (ve ck) (vehicle cr (emiss car, i_sa_ sa_distr fatigue straints ruck, i_s sa_distr cot_truck cot_truck cot, i_sa_ car car fatigue ct, i_sa_ ct	dui_cal dui_cal action_ e_car, i_ ), i_sa_vi action_ e_truck, raints), k, i_sa_v a_dui_p action_ e_pzw, i dui_pt ( action_ e_pz, i_s a_dui_b	io), rice will costs) /or fue  (drivin car (dist) sa_rest reh_del truck (di truck (d i_sa_re reh_del drivin cost (dist) cost (dist)	g under raction raint_ca ect_car iving und straction straction defect under raction defect_ ving und	mption  (by (for (belt)), (horder (by (truck) (ck, (der (by (tx_p2w) (by (by (der											
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	TPM policy levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c factoro i_sa_s influe device (belt t i_sa_b influe device c t i_sa_s influe device l_sa_s influe device l_sa_s influe device	oad_ca eh_stoi ap_tech peed_c_ solution	ck (fleet ck (fleet cmkt (v cmkt (v cmkt (v cmkt (v cmkt (v cmkt (emiss ck, i_	ehicle relation and the least of the least o	io), rice wii I costs) //or fue (drivin car (dist sa_rest ruck (di	g under raction raint_ca 'ect_car 'iving un sistraction 'ect_tru 'ing unconstraction 'n_defect_ uring unconstraction 'n_defect_ uring unconstraction 'n_defect_ uring unconstraction 'n_defect_ uring unconstraction 'ing unconstraction 'ing unconstraction 'ing unconstraction 'ing unconstraction 'ing unconstraction 'ing unconstraction 'ing unconstraction' 'ing unconst	mption (by (for (belt)), nder on (by truck der on (by tzt_p2w (by pt der on (by											
	TPM policy levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_sa_s i_sa_s i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c influe i_sa_c i_	oad_ca eh_sto eh_sto eh_sto en_reck eh_sto eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto eh_sto en_reck eh_sto eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto eh_sto en_reck eh_sto en_reck eh_sto en_reck eh_sto en_reck eh	ck (fleet  , mkt (v (vehicle)  ar, i_sa_ ar, i_sa_ as_distr fatigue ssa_distr struck, i_s_ ssa_distr struck, i_s_ ssa_distr fatigue ssa_distr fatigue ssa_distr fatigue ssa_distr fatigue fatigue fatigue fatigue fatigue fatigue fatigue ssa_distr fatigue stock_fatigue stock_fatigue stock_fatigue stock_fatigue	ehicle releasion and dui_car action_ a	io), io), irrice wir id costs) //or fue  (drivin car (dist) car (d	g under g under g under g under g under get_car eet_car eet_traction get_traction g	mption (by (c) (by truck cck, der n (by tt_p2w (by pt der nn (by tt_bike											
	TPM policy levers		34	Environment	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_sa_s influe device device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe	oad_ca oad_ca eh_stoo ap_rpcs ap_tech mfactos s) peed_c_nce), i_ peed_c_nce), i_ individual seed_ca nce), i_ indiv	ck (fleet  _mkt (v  _mkt (v  _nkt (v  n (vehicli  ar, i_sa_  ar, i	ehicle releasing to the control of t	io), irice wii il costs) il costs) il costs) (drivin ar (dist ssa_rest esh_det ruck (di i_sa_re esh_det ruck (drivin a_vel) driving ike (drivin a_vel) ike (drivin a_vel ike (drivin a_vel a_vel a_vel ike (drivin	g under g under g under g under g under get_car eet_car eet_traction get_traction g	mption (by (c) (by truck cck, der n (by tt_p2w (by pt der nn (by tt_bike											
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	TPM policy levers		34	Environment	p_fd_l_sys_v_lsy	oad_ca oad_ca eh_stov  approve  mfactce	ck (fleete ck (fleete ck (fleete) ar, i_sa_ ar, i_sa_ ar, i_sa_ ar, i_sa_ ar, i_sa_ ar, i_sa_ ar, i_sa_ distra- fatigue the illing the illing fatigue the illing the illing fatigue fatig	ehicle relector e le capita sion ancome de la capita sion ancome de la capita sion ancome de la capita sion ancome de la capita sion ancome de la capita del capita de la capita del capita de la capita del capita de la capita de la capita de la capita de la capita de la capita de la capita de la capita de la capita de la capita del capita de la capita del capita de la capita de la capita de la capita del capita del capita del capita del capita del capita de	io), io), io), irice wii il costs) /or fue (drivin car (distasa_rest eh_del rruck (drivin i_sa_res eh_del god i_sa_vel drivin got (distasa_vel ibike (drisa_vel crem iriche (rollingcrem ingine) sa_fire, sshort s	g under raction raint_ca ect_ca ect_ca under unistraction categories and categori	(by ir (belt ir, on (by truck ir) (belt ir, on (by truck ir) (by truck ir) (by pt der in (by tt_bike ir) (by ir) (by ir) (by ir)											
	TPM policy levers		34	Environment	p_fd_l i_vs_v i_vs_v i_vs_c i_vs_c i_sa_s influe device use & i_sa_s influe device device i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s i_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_sa_s i_s i_s i_s i_s i_s i_s i_s i_s i_s i	oad_ca oad_ca eh_stoo app_rpcs	ck (fleet ck (fleet ck (fleet ck (fleet ck (tek)	ehicle releasion and control of the	io), io), irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice iric	g under raction raint_ca cect_car straction raint_cact_car straction raint_cact_car straction raint_cact_car straction raction	mption  (by  (c)  (c)  (c)  (c)  (c)  (c)  (c)  (c											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l i_vs_v_i i_vs_c_i i_vs_c_i i_vs_c_i i_vs_c_i i_sa_s influe device (belt i_sa_s influe device (belt i_sa_s influe device (belt i_sa_s influe device (belt i_sa_s influe device (belt i_sa_s influe device (belt i_sa_s influe influe i_sa_s influe device (belt i_sa_s influe influe i_sa_s influe influe i_sa_s influe influe i_sa_s i_sa_s influe i_sa_s i_s i_sa_s i_s i_s i_s i_s i_s i_s i_s i_s i_s i	oad_ca oad_ca ca eh_sto. ap_rpcs app_red emfactors by epeed_c nce), i epeed_t line	ck (fleet to k (fleet to k (fleet to k (fleet to k ) k (fleet	ehicle relection in the leave the le	io), io), irice wiirice  g under gunder raction aint_ca (ect_car viving un sistraction a_defect_tru under raction) a_defect_tru under raction a_defect_tru	(by (by truck) (by truck) (by truck) (ck, der (by truck) (by pt der (by ttuck) (by ttuck												
	TPM policy levers		34 35 36	Environment	p_fd_l i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_ev_e i_ev_e i_sa_s influe device (belt t i_sa_s influe device fevice i_sa_s influe device i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s influe i_sa_s i_sa_t i	oad_ca oad_ca oad_ca eh_sto.  ap_rpcs app_red emfacto. b) s) color	ck (fleet to k (fl	lehicle procession and consistent of the constitution of the const	io), io), irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice wii irice iric	g under gunder raction aint_ca (ect_tru) istraction istraction in defect_tru raction in defect_true	(by Ir (belt Ir, Ir, Ir, Ir, Ir, Ir, Ir, Ir, Ir, Ir,											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l _i_vs_vi_vs_c _i_vs_c _i_vs_c _i_vs_c _i_vs_c _i_sa_s _influe _device _device _device _i_sa_s _influe _device _i_sa_s _influe _device _i_sa_s _influe _device _i_sa_s _influe _device _i_sa_s _i_sa_c _i_sa_	oad_ca oad_ca oad_ca elseto ap_trocs ap	ck (fleet ck. fleet ck. fleet ck. fleet ck. fleet ck. ck. fleet ck. ck. ck. ck. ck. ck. ck. ck. ck. ck.	lehicle preceded to the control of t	io), io), irice wii il costs) /or fue (drivin car (distassa- sa- gest ruck (di ruck	g under raction g under raction in the case of the cas	(by (belt ), and of the control of t											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l _vs_v _l_vs_c _l_vs_c _l_vs_c _l_vs_c _l_vs_c _l_vs_c _l_sa_s _influe device device device device l_sa_s _isflue device device device c _sa_c _c _l_sa_	oad_ca oad_ca oad_ca ele_stov ap_tres s) s) child re peed_t more, i peed_t peed	ck (fleet ck (fl	ehicle p le capitrision and le le capitrision and l	io), irice wit id costs) /or fue (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (distance) (drivin car (drivin car (distance) (rolling corew, car (rolling corew_, car (rolling corew, car (rolling corew, car (rolling corew, car (rolling corew, car (rolling corew, car (rolling core	g under raction ariant_ca ect_car iving un istractic straction _defect under raction _defect _ing unc straction _defect _ring unc straction _defect _ring unc straction _defect _ring unc _action _defect _ring unc _action _defect _ring unc _action _defect _ring unc _action _defect _ring unc _action _defect _n crew _straction _defect _n crew _air, i_s _ea) erivices ea) ea) erivices ea) _a	(by (by cryster) (between the control of the contro											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l_i_vs_v_l i_vs_c_li_vs_c_li_vs_c_li_vs_c_li_vs_c_li_vs_c_li_vs_c_li_sa_s_linflue devicce devic	oad_ca oad_ca eh_stoo pap_rpcs pap_rpcs ppeed_c_ ppeed_ca ilidate peed_ca ilid	ck (fleet ck (fl	lehicle per le capitrision and consistent and consi	io), irice wii i	g under raction aint care to c	(by (by cryster) (between the control of the contro											
	TPM policy levers		34 35 36	Environment Safety  Comments	p fd l l_vs_v l_vs_c l_vs_c l_vs_c l_vs_c l_vs_c l_vs_c l_vs_c l_sa_s linflue device (belt t l_sa_s linflue device l_sa_s linflue device l_sa_s linflue device c l_sa_s linflue device c l_sa_s linflue device l_sa_s linflu	oad_cae eh_stoo eh_stoo pag-trees ped_can pag-trees ped_can pag-trees ped_can pag-trees ped_can pag-trees ped_can pag-trees ped_can pe	ck (fleet ck (fl	ehicle p le capitz le capi	io), io), irice wii il costs) /or fue (drivin il costs) /or fue (drivin il costs) /or fue (drivin il costs) /or fue il costs) /or fue il costs	g under raction in a raction in	(by (by character) (b											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_sa_c influe device device device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_c i_	oad_ca oad_ca eh_stoo pap_rpcs pap_rpcs ppeed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_t_cap_tech peed_	ck (fleet ck (fl	ehicle je capitri ision and dui_cai action	io), irice wii il costs) (/or fue wii il cost	g under raction in a consultation of the consu	mption  (f) (by (f) (f) (f) (f) (f) (f) (f) (f) (f) (f)											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd_l i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_vs_c i_sa_c influe device device device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_s influe device i_sa_c i_	oad_ca oad_ca eh_stoo pap_rpcs pap_rpcs ppeed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_c_cap_tech peed_t_cap_tech peed_	ck (fleet (k. fleet	ehicle je capitri ision and dui_cai action	io), irice wii il costs) (/or fue wii il cost	g under raction in a consultation of the consu	mption  (f) (by (f) (f) (f) (f) (f) (f) (f) (f) (f) (f)											
	TPM policy levers		34 35 36	Environment Safety  Comments	p_fd1 i_vs_v i_vs_c i_vs_c i_vs_c i_vs_c factor i_sa_s i_sa_t i_sa_s influe device (belt ut device (belt ut device i_sa_b i_sa_s influe device c c errors i_sa_c i_sa_c i_sa_c i_sa_c i_sa_c i_sa_t i_	oad_ae aeh_stoo aeh_stoo ap_teck_sp_te	ck (fleet (k. fleet	ehicle je capitri ision and dui_cai action	io), irice wii il costs) (/or fue wii il cost	g under raction in a consultation of the consu	mption  (f) (by (f) (f) (f) (f) (f) (f) (f) (f) (f) (f)											
	TPM policy levers		34 35 36	Environment Safety  Comments	p.fd.l l_vs_v l_vs_c l_vs_c factor l_sa_s influe device (belt l l_sa_s influe device l_sa_s influe device certors l_sa_s influe device Cober device device (belt l l_sa_s influe device certors l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_s l_sa_e l_sa_e	oad_cae eh_stoo ae eh_stoo ap_teck ap_teck s) peed_c peed_t peed_	ck (fleet (k. fleet	ehicle   ecapitic lecapitic  io), irice wii il costs) /or fue (drivin (drivin (drivin (drivin (drivin (drivin sa_rest sa_rest sa_rest sa_rest sa_rest sa_rest sa_rest sa_vel drivin (drivin sa_vel drivin sa_vel drivin sa_vel drivin sa_vel sa_vel sa_vel sa_vel sa_vel drivin sa_vel sa_vel sa_vel drivin sa_vel drivin sa_vel sa_v	g under raction gunder raction aint_ca det_c	(by ir (belt												
	TPM policy levers		34 35 36	Environment Safety  Comments	p.fd.l l_vs_v l_vs_c l_vs_c factor l_sa_s influe device (belt l l_sa_s influe device l_sa_s influe device certors l_sa_s influe device Cober device device (belt l l_sa_s influe device certors l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_e l_sa_s l_sa_s l_sa_s l_sa_e l_sa_e	oad_ae eh_ston ap_teck ap_teck ap_teck s) peed_c_ncel, i_ peed_t_incel, i_	ck (fleet , implementation ) characteristics of the control of the	ehicle   ecapitic lecapitic  io), irice wii il costs) /or fue (drivin (drivin (drivin (drivin (drivin (drivin sa_rest sa_rest sa_rest sa_rest sa_rest sa_rest sa_rest sa_vel drivin (drivin sa_vel drivin sa_vel drivin sa_vel drivin sa_vel sa_vel sa_vel sa_vel sa_vel drivin sa_vel sa_vel sa_vel drivin sa_vel drivin sa_vel sa_v	g under raction gunder raction aint_ca det_c	(by ir (belt												

## 1.1.26 HDV Infrastructure Charge (98)

Section		(	Policy name	HDV ir	nfrastru	cture ch	arge			-				-			1				
A			Policy Area	1 Prici			- 0-										+				
			Policy Category	Pricing													1				
		(1)	Policy Subcategory	1.1 Inf	rastruct	ure cha	rging /	access r	estricti	ons sch	eme						]				
		4	Transport Policy Measure								avy-duty										
											onents existin				or wear	and					
		-	Main Targets								tion and				ce emp	ty	1				
			· ·		ngs and					·				•							
		6	White Paper Reference					d smart													
								ovoiding nd taxat		ions											
		_		IIIILIAL	IVE 33. S	illait pi	icing a	iiu taxat	1011								_				
В						Pass	enger						Freigh	t			1				
						_		Ι				ê		Ī			1				
				=	ad ()	Road on-Urba	Air	ije de	Slow Modes	=	ad (nec	Road n-Urba	Air	WM	t Sea	iji					
				Rail	Road (Urban)	Road (Non-Urban)	<	Public Transport	ls 8	Rail	Road (Urban)	Road (Non-Urban)	<	≥	Short Sea	Maritime					
						Z						٤				_	<u> </u>				
	4 5 A		Volume [passenger/tons]							n		0		1	1		]				
	Indirect Traffic Impacts	×	Transport performance [vkm]							1		<b>⊘</b>		1	⇒						
	<u></u>	ç	Transport performance [pkm/tkm]							1		0		1	1						
		10	Travel time [min]																		
		11	Travel distance [km]											1			1				
		12	Out of pocket costs [EUR/vkm]									n									
	igs st	13	Other cost components [EUR/vkm]														1				
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)																Sectora		
	_		Comments														_				
																	Overall	Aggricultural	Industria	Transport	Other Services
																	ò	eg Tri	Indi	Trar	Ser
		16	Economic growth [gdp]														-	1	_	_	
	_	_	Employment [#employed]														⇒	⇒	⇒	<b></b>	<b>⇒</b>
	Direct Economical Impacts	_	Resources: Energy														-	-			
	Dire	_	Resources: Material																	- 73	
	<u> </u>		Other																		
			Comments																		
	# = ¥	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	23	Other														1				
			Comments																		
	enta	25	GHG emissions [g/vkm]									9					]				
	Direct vironmer l	26	(Local) air pollution [g/vkm]									0									
	Direct Environmenta I		Other														<u> </u>				
	ū	28	Comments														_				
				2	~*				±												
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	흥송	Environment	et/											
	ansl			mog	cono	asse Dem	Freig	Vehicle Stock	ioi	Safety											
С	Σ						Ü														
	₽	_	HT Modules addressed by TPM	Χ	Χ	Χ	✓	✓	Χ	Χ											
			Demography	n/a																	
	TPM policy levers	31	Economy & Resources Passenger Demand	n/a n/a																	
	cy le		Freight Demand		oad_fa	tor, i_f	d_toll_	cost													
	Polic		Vehicle Stock					cost or c	harges	for											
	Σ	_		trucks	)																
	-		Environment Safety	n/a n/a																	
			Comments	II/ a																	
			References	Europ	ean Con	nission	(2011):	Directiv	/e 2011/	/76/EU											
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								in infras													
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								icles fo		e of											
					n infras						Ī										
				Furon	oon Com	nmissio	n (2014	): Strate	agy for		Ī										
								es' fuel		ption											
				and Co	D2 emis	sions, C	OM(20	14) 285	final.												
											1										
		48	Performed by	KIT																	

## 1.1.27 Internalisation of External Costs (100)

Section		0	Policy name	Intern	alisatio	n of ext	ernal co	osts									1				
A		1	Policy Area	1 Prici	ng												1				
			Policy Category	Pricing																	
		3	Policy Subcategory		rastruct																
					ernal co el taxati		ges														
		4	Transport Policy Measure	Procee	d with	the inte						nodes o		port app	olying c	ommor	1				
												n mode.									
			Main Targets White Paper Reference		alisatio Iern infi						iodes.										
		Ŭ	winter aper nevertice		tting pri																
		Ш		Initiati	ve 39: S	mart pr	ricing ar	nd taxa	tion												
_																					
В						Pass	enger						Freigh	t			4				
				Rail	Road (Urban)	Road (Non-Urban	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)	Air	WWI	Short Sea	Maritime					
	۷ ۲	7	Volume [passenger/tons]	1	⇒	⇒	0	⇒	1	⇒	⇒	⇒	⇒	⇒	⇒	⇒					
	Indirect Traffic Impacts	8	Transport performance [vkm]	1	⇒	⇒	0	⇒	1	⇒	⇒	⇒	⇒	⇒	⇒	⇒					
	2 ≒ ₹	9	Transport performance [pkm/tkm]	7	⇒	⇒	<u>~</u>	⇒	1	⇒	⇒	⇒	⇒	⇒	⇒	⇒					
		10	Travel time [min]	-	<u> </u>	<u> </u>	-		*			<del>                                     </del>	<u> </u>	+							
			Travel distance [km]	1							<del>                                     </del>	<del>                                     </del>		1	1		1				
			Out of pocket costs [EUR/vkm]	1	7	7	1	1		1	1	7	1	⇒	1	1	1				
			Other cost components [EUR/vkm]	7	1	1	1	1		7	7	7	1	1	1	1	1				
			Qualitative effects (e.g. liability,)	"	"	"	"	"		"	"	1	"	1/	"	"			Sectora		
			Comments	Rail wi	II bene	fit most	from in	nplem	entatio	of the	intern	alisation	n of ext	ernal co	osts for	all					
	Direct Traffic Impacts			airport regula For roa emissi For rai For sea standa fuel ch costs ( For IW The EC	ts (responded) ted, at I ad there a conschering a and points for larging a equipm W no af	ectively large air e are tole me app are trac orts the low SO at ports aent and ffecting evelop a	rusers, rports n Is and f blies. k charge interna k, NOx, (zero-e d infrast policy i n appro	noise do allow uel tax es and filisation noise, emission cructure for inla	lepende wed, for es, and fuel tax n of ext waste, I n ships e costs, nd wate	end land small a vehicle but no ernal co itter, sh . These fuel cos	emissic ests are nort side e are ex sts etc.)	ction proces). Infra possible ccm / processible on schere expressible e electric e electric pected refore refore ructi le due t ower d me app sed thr icity (b to have	ure sub- co cohes epende lies. ough se erth) an e a stror	sidies a sion pol nt) but a and p ad alteri ng effect	re icy. no ort native t on	Overall	Aggricultural	Industrial	Transport	Other Services	
		16	Economic growth [gdp]	CXAIIII	ile tilis į	l	). 										-	-	_		<b>-</b>
	_	_	Employment [#employed]														⇒	⇒	⇒	7	⇒
	nica cts		Resources: Energy														-	-	_	2	-
	Direct Economical Impacts	_	Resources: Material																	73	
	<u> </u>		Other																		
			Comments																		
	t = £	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	23	Other																		
		-	Comments																		
	Direct Environmenta I Impacts		GHG emissions [g/vkm]																		
	Direct ironme I Impacts		(Local) air pollution [g/vkm]																		
	o ij		Other																		
	ш	28	Comments																		
С	TPM translation			Demography	Economy & Resources		_	Vehicle Stock	Ē	Safety											
	¥		HT Modules addressed by TPM	Χ	Χ	✓	✓	✓	Χ	Χ	1										
	S		Demography	n/a							ļ										
	TPM policy levers		Economy & Resources Passenger Demand	n/a indo	ore_tol	Locat					-										
	iγ		Freight Demand		oll_cost						1										
	od L		Vehicle Stock		f_taxfu		tax)				Ĭ										
	TPIN	35	Environment	n/a							]										
		-	Safety	n/a							<u> </u>										
			Comments References	and Ec Measu	Delive onomic ires, Fac Fact She	Impact ct Sheet	s of Tra : No. 4 (	nsport Kritzing	Policy ger et al												
		48	Performed by	KIT							j										

## 1.1.28 Circulation Tax for Cars (102)

16   Economic growth [gdp]   17   Employment [#employed]   18   Resources: Energy   19   Resources: Material   20 Other   21 Comments   22 Safety [#accidents/vkm, #fatalities/vkm]   23 Other   24 Comments   25 GHG emissions [g/vkm]   37   37   38   38   39   39   39   39   39   39	out of	phase out of	and the phase nt cars.	issions and the efficient cars	2 emissio fuel effic sport	CO2 en	ased on		tration t				tion	2 Taxat	Policy Area	1		
Spelley Category   Pricing	out of	phase out of	and the phase nt cars.	issions and the efficient cars	2 emissio fuel effic sport	CO2 en	ased on		tration t			avation	3	_		2		
Significance (standard of treatment and a production of treatment and of common rules for annual car directation taxes). Policy set to simulate the implementation of common rules for annual car directation taxes). Policy set to simulate the implementation of common rules for annual car directation taxes). Policy set to simulate the implementation of common rules for annual car directation taxes have don CO2 emissions and the phase out of registration taxes at EU level in order to encourage the use of full efficient cars.  Setting free sight and avoiding distortions, i.e. (39) Smart pricing and taxation  The product of the paper Reference  3.3. Getting prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (standard prices right and avoiding distortions, i.e. (39) Smart pricing and taxation  The paper Reference (stan	out of	phase out of	and the phase nt cars.	issions and the efficient cars	2 emissio fuel effic sport	CO2 en	ased on		tration t			avation						
A Transport Policy Measure   Vehicle Exaction (circulation Registration taxes). Policy set to insulate the implementation of common rules for annual card cardialist taxes based on CO2 emissions and the phase out of registration taxes at \$U1 evel in order to encourage the use of the efficient cars.    S Main Targets	out of	phase out of	and the phase nt cars.	issions and the efficient cars	2 emissio fuel effic sport	CO2 en	ased on		tration t					2.2 Tra		3		
Section   Passenger   Registration   Race at £0   level in order to encourage the use of flow   Efficient cars.		on	nt cars.	efficient cars t	fuel effic	e of fue		avac ha		& regis	lation							
Sectoral Page   Sectoral Pag	Markine			t	sport		the use											
B    Passenger   Freight	Maritime		d taxation			transpo		ourage	r to end	in orde	Jlevel	xes at E	ation ta	registr				
Passenger    Passenger   Prelight   Passenger   Prelight	Maritime		d taxation	icing and taxa	rt pricing		m road t	ion fro	d pollut	sion and	2 emiss	use, CO	ing fuel	Reduci	Main Targets	5		
1   1   1   1   1   1   1   1   1   1	Markime	Short Sea Maritime				smart p	e. (39) S	ions, i.	g distort	voiding	t and a	ices righ	tting pr	3.3. Ge	White Paper Reference	6		
1   1   1   1   1   1   1   1   1   1	Martime	Short Sea Maritime																
Type   Type	Martime	Short Sea Maritime		Freight	Freig						nger	Passe						В
Type   Type	Martim	Short Se Maritim	g l		au)	an)	_			ť		au)	-					
Type   Type	Wa	Sho	T Se	¥ ķ	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	oad Crk	oad	ail	low	blic podst	Αį	oad -Crk	oad	ā				
Type   Type			Sho	`   =	io \	ě i	. J	<u>~</u>	ΣŠ	Trar	`	ě ė	# 5	-				
Stransport performance [vkm]					_											_		
10   Travel distance   Emily (kin)					⇒	⇒	⇒					⇒	⇒				t e t	
10   Travel distance   Emily (kin)					⇒	⇒	⇒					⇒	⇒		Transport performance [vkm]	8	dire raff rpac	
10 Travel time [min]   11 Travel distance [km]   12 Out of procket costs [EUR/vkm]   13 Other cost components [EUR/vkm]   14 Out of procket costs [EUR/vkm]   15 Omments   15 Comments   15 Comments   16 Economic growth [gdp]   17 Employment [#employed]   18 Resources: herepy   19 Resources: herepy   19 Resources: herepy   19 Resources: herepy   19 Resources: herepy   19 Resources: material   10 Other   12 Comments   17 Employment [#employed]   18 Resources: herepy   19 Resources: herepy   19 Resources: material   10 Other		1			⇒	⇒	⇒					⇒	⇒		Transport performance [pkm/tkm]	9	5 ⊢ 5	
12   Out of pocket costs   EUR/vkm															Travel time [min]	10		
12   Out of pocket costs [EUR/vkm]   3   3   3   3   5   5   5   5   5	-	_			+													
13   Other cost components   EUR/vkm							<b>-</b>						<b>-</b>	1			ŀ	
14   Qualitative effects (e.g. liability,)   Sectoral	_				7	⇒	<b>→</b>					→	<b>→</b>	1				
																	다. 달 달	
International Color   International Color	Sectoral																Dire Traf	
16   Economic growth [gdp]   17   Employment [#employed]   18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety [#accidents/vkm, #fatalities/vkm]   23   Other   23   Other   24   Comments   25   GHG emissions [g/vkm]   37   Other   27   Other   28   Comments   27   Other   28   Comments   28   Comments   29   Other   29   Other   29   Other   29   Other   20   Oth															Comments	15	. =	
16   Economic growth [gdp]   17   Employment [#employed]   18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety [#accidents/vkm, #fatalities/vkm]   23   Other   23   Other   24   Comments   25   GHG emissions [g/vkm]   37   Other   27   Other   28   Comments   27   Other   28   Comments   28   Comments   29   Other   29   Other   29   Other   29   Other   20   Oth	Overall  Ggricultura Industrial  Transport Other Services																	
16   Economic growth [gdp]   17   Employment [#employed]   18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety [#accidents/vkm, #fatalities/vkm]   23   Other   23   Other   24   Comments   25   GHG emissions [g/vkm]   30   GHore   37   Other   38   Comments   38   Comments   39   Chocal   30	grici Ove																	
17   Employment [#employed]   18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety [#accidents/vkm, #fatalities/vkm]   23   Other   24   Comments   25   GHG emissions [g/vkm]   36   Clocal) air pollution [g/vkm]   37   Other   28   Comments   27   Other   28   Comments   28   Comments   29   Comments   20	%   =   +   **																	
18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety   (#accidents/vkm, #fatalities/vkm)   23   Other   24   Comments   25   Giffe emissions   [g/vkm]   36   Giffe emissions   [g/vkm]   37   Other   28   Comments   38   Comments   39   Other   39	⇒														Economic growth [gdp]	16		
18   Resources: Energy   19   Resources: Material   20   Other   21   Comments   22   Safety   (#accidents/vkm, #fatalities/vkm)   23   Other   24   Comments   25   Giffe emissions   [g/vkm]   36   Giffe emissions   [g/vkm]   37   Other   28   Comments   38   Comments   39   Other   39															Employment [#employed]	17	_	
20 Other   21 Comments   22 Safety [#accidents/vkm, #fatalities/vkm]   23 Safety [#accidents/vkm, #fatalities/vkm]   23 Other   24 Comments   25 GHG emissions [g/vkm]   37 Other   26 (Local) air pollution [g/vkm]   37 Other   28 Comments   37 Other   38 Sanda Sa																	r ica	
20 Other   21 Comments   22 Safety [#accidents/vkm, #fatalities/vkm]   23 Safety [#accidents/vkm, #fatalities/vkm]   23 Other   24 Comments   25 GHG emissions [g/vkm]   37 Other   26 (Local) air pollution [g/vkm]   37 Other   28 Comments   37 Other   38 Sanda Sa																	Dire	
22   Comments   22   Safety (#accidents/vkm, #fatalities/vkm)   22   23   Other   24   Comments   25   GHG emissions [g/vkm]   37   30   Comments   30   Com																	<u> </u>	
22   Safety [#accidents/vkm, #fatalities/vkm]   23   Other   24   Comments   25   CHG emissions [g/vkm]   37   30   Chements   27   Chter   28   Comments   27   Other   28   Comments   27   Other   28   Comments   27   Other   28   Comments   27   Other   28   Comments   27   Other   28   Chments   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other   27   Other   28   Other																		
23   Other   24   Comments   25   GHG emissions [g/vkm]   3   30   Demography   30						1								1				
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24 (Comments  25 GHG emissions [g/vkm]															Other	23	Soc	
C Applied A Norman Market Mark																		
C Applied A Norman Market Mark					⇒ l	⇒	⇒					⇒	⇒		GHG emissions [g/vkm]	25	E .	
C Applied A Norman Market Mark					⇒	⇒	⇒					⇒	⇒		(Local) air pollution [g/vkm]	26	ect	
C Applied A Norman Market Mark															Other	27	直真	
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E 29 HT Modules addressed by TPM X X X X X X X X X X X X X X X X X X X								Saf	viro	Veh	Fre	asse	Sonc	lo m			ans	
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30 Demography n/a								Χ	Χ	✓	Χ	Χ	Χ	Χ	HT Modules addressed by TPM	29	₽	
31 Francomy & Resources n/a														n/a	Demography	30		
Sa Economy & Resources														n/a	Economy & Resources		TPM policy levers	
32 Passenger Demand n/a																	e S	
33 Freight Demand n/a								411				1	£	_			olic	
34 Vehicle Stock i_vs_nf_rof_cst_othr (vehicle costs or other task)  SEnvironment n/a								task)	or other	costs c	venicle	t_othr (	r_rot_cs				ΣŽ	
35 Environment   n/a																	Ħ	
37 Comments														.1/ 0				
47 References ASSIST fact sheet no.10.											0.	et no.1	fact she	ASSIST				
														TML	Performed by			

## 1.1.29 Improving Local Public Transport (109)

Section		0	Policy name	Improv	ing loc	al publi	c trans	oort					-				1				
A		1	Policy Area	6 Infra	structu	e											i				
			Policy Category	Efficie	ncy star	ndards a	nd flar	king m	easures												
			Policy Subcategory			nd qual											ļ				
		4	Transport Policy Measure								cy and r			blic tra	nsport						
		- 5	Main Targets								vel time ss, and i			gration	to redu	ice	1				
			Talgets			local le		.5, co	0,1,000	y deces	,s, and n		JUI 1111C	6.00.0							
											e aware										
									nbinatio	ons of n	nodes fo	or single	routes	(car sh	aring, b	ike					
		-	White Paper Reference			public t and int			ity cyct	om							l				
		ľ	Wille Fuper Nevertine			ality an			114 3430	C											
				Initiati	ve 22: S	eamles	s door-	to-doo	r mobili	ty											
_																	1				
В						_	enger		1		1		Freight	t	1	1	ļ				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WWI	Short Sea	Maritime					
	ಕಂಪ	7	Volume [passenger/tons]		0			1	⇒												
	Indirect Traffic Impacts	8	Transport performance [vkm]		<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>			n	⇒												
	<u> </u>	9	Transport performance [pkm/tkm]		2			1	⇒	t	1	ļ					1				
		10	Travel time [min]		<u> </u>			2	⇒		1	<del>                                     </del>					1				
			Travel distance [km]					7	⇒	<del>                                     </del>	+	<del>                                     </del>					1				
			Out of pocket costs [EUR/vkm]					<i>N</i>	⇒								1				
	Direct Traffic Impacts		Other cost components [EUR/vkm]					20	7								1				
	Trai Impi				<u>.                                    </u>	<u> </u>				<u>.</u> .	<u> </u>										
			Qualitative effects (e.g. liability,) Comments	Improv	/ement	in leve	i of ser	vice for	bus an	train							<del>-</del>		Sectora -		. "
		13	Comments														Overall	Aggricul tural	Industri al	Transport	Other Services
		16	Economic growth [gdp]														1			1	
	-	17	Employment [#employed]															1		1	
	Direct Economical Impacts	18	Resources: Energy															†		Ħ	
	Direct conomic Impacts	19	Resources: Material															<b>†</b>		<u> </u>	
	й	20	Other															-			
			Comments																		
	11 _ 8	22	Safety [#accidents/vkm, #fatalities/vkm]		0																
	Direct Social Impacts	- 22															}				
	ο <u>ν</u> <u>Ε</u>		Other Comments														1				
	tal		GHG emissions [g/vkm]														i				
	nen acts	26	(Local) air pollution [g/vkm]					⇒									l				
	Direct ironme impacts	_	Other					_		l							1				
	Direct Environmental Impacts		Comments														ĺ				
	io			phy	a sa	ja p	ء د		Environment												
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	onm	Safety											
С	trar			emo	Econ	Pass	F P	> s	nvin	SS											
	Σ	20	HT Modules addressed by TPM	Х	X	/	X	X	Х	V	1										
			Demography	n/a		<b>V</b>	^	^	٨	Χ	-										
	s		Economy & Resources	n/a							1										
	evers	22	Passenger Demand		rban_d	uaetim	e, i_pd	urban	dutrav	eldist,	1										
	ίς				rban_tı	aveltin	ne														
	TPM policy lev		Freight Demand	n/a							4										
	₽F		Vehicle Stock Environment	n/a n/a							1										
		_	Safety	n/a							1										
			Comments								]										
			References			nmissio ment of															
		48	Performed by	Europe KIT	an Con	nmissin	n /2012	) Studi	on the		}										

## 1.1.30 CO<sub>2</sub> Certificate System for Road Transport (110)

Section		0	Policy name	CO2 ce	rtificat	e syster	n for ro	ad trans	port								1				
Α		1	Policy Area	3 Rese	arch an	d innov	ation										1				
		2	Policy Category	Pricing	;																
		3	Policy Subcategory	3.2.2 P	romoti	on and i	ncentiv	es .													
		4	Transport Policy Measure	A certi this pr additio	ficate p ice ove onal cos	rice in o	onstan ure tim I type (	t Euro's ne perio	(2005) d can b	per tor e defir	2 certifi n CO2 ca ned. The O2 spec	n be im	plemer ate pri	nted an	nverted	in an					
		5	Main Targets	• •		CO2 em		rom car	or road	transo	ort										
			White Paper Reference	2.1. A I	urope	n trans	port re	search a	nd inno	ovation	policy, e sustaii		_								
				labelli	ng for C	O2 emi	ssions a	and fuel	efficie	ncy.							]				
В						Passe	enger					1	Freigh	t							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	wwi	Short Sea	Maritime					
	# 0 %	7	Volume [passenger/tons]		⇒	⇒	⇒	⇒			⇒	⇒	⇒	⇒	⇒	⇒					
	Indirect Traffic Impacts	8	Transport performance [vkm]		⇒	⇒	⇒	⇒			⇒	⇒	⇒	⇒	⇒	⇒	1				
	3 5 5	9	Transport performance [pkm/tkm]		⇒	⇒	→	⇒			⇒	⇒	⇒	⇒	⇒	⇒	i				
	<b> </b>	_			7	7		-			7	-	-	-	-	-	1				
			Travel time [min]												ļ		ļ				
			Travel distance [km]														<u> </u>				
	4 C E	12	Out of pocket costs [EUR/vkm]		⇒	⇒	⇒	⇒			⇒	⇒	⇒	⇒	⇒	⇒					
	Direct Traffic Impacts	13	Other cost components [EUR/vkm]																		
	0 F E	14	Qualitative effects (e.g. liability,)																Sectora	ı	
			Comments														=				. × 8
																	Overall	Aggricul tural	Industri al	Franspor t	Other Services
		16	Economic growth [gdp]														⇒			⇒	
	_	17	Employment [#employed]																		
	Direct Economical Impacts		Resources: Energy														_				
	Dire non npa																⇒			⇒	
	_ 8 =		Resources: Material																		
			Other																		
			Comments				ı —	_		1	1	1	_				1				
	Direct Social Impacts		Safety [#accidents/vkm, #fatalities/vkm]																		
	_ <u>∞</u> <u>E</u>	-	Other Comments																		
			GHG emissions [g/vkm]					١.,	ı —			T	T .	۱.	Г						
	Direct Environmental Impacts				1	9	0	0			7	7	7	0							
	Direct ronme mpacts		(Local) air pollution [g/vkm]		⇒	⇒	⇒	⇒			⇒	⇒	⇒	⇒							
	o iž E	-	Other																		
	<u> </u>	28	Comments																		
	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	Environment	Safety											
С	ξ	Щ			m 2																
	Ħ	29	HT Modules addressed by TPM	Χ	✓	Χ	Χ	✓	Χ	Χ											
			Demography	n/a																	
	ver		Economy & Resources		elta_po	_cost															
	S e	-	Passenger Demand	n/a																	
	olic Silo		Freight Demand	n/a			.0001 (		,												
	TPM policy levers		Vehicle Stock Environment	n/a	_exau	y_eur_	10001 (1	uei cost	S)												
	=	-	Safety	n/a n/a																	
			Comments	.,, a							t										
			References	SAMM wide C	ER, Pot :O2-Cer	CH; LEC entials a tificate ria, 45th	and Effe Trading	ects of a g Schem	Europe e upon	ean- Road											
		48	Performed by	TML							İ										

#### 1.1.31 CO<sub>2</sub> Feebates for Road Transport (111)

Section			0	Policy name	CO2 fe	ebates	for roa	d transp	oort													
Α				Policy Area		arch an	d innov	ration														
				Policy Category Policy Subcategory	Pricing																	
		- 1		Transport Policy Measure		romotion set to s				ntation	of a fee	bates fo	or road	ranspo	rt to sti	mulate	the					
			Ì	,								native fu										
												allel set	tting fee	es for v	ehicles	emittin	g more					
			5	Main Targets		ing CO2						viding a	nrice ir	centiv	a towar	de care		-				
			,	Maiii Taigets		ower CC				enicies	ру ріо	viuilig a	price ii	icentiv	e towai	us cais						
		Ī	6	White Paper Reference								policy,										
												e sustaii	nable b	ehaviou	ır,.i.e. (	28) Veh	icle					
			_		labelli	ing for C	.U2 emi	issions	and tue	еттісіє	ncy	_										
В			$\exists$				Dace	enger						Freigh								
_							_							c.g								
					=	a (e	Road (Non-Urban)	_	Public Transport	≥ Se	=	a (e	Road (Non-Urban)	_	3	Sea	me					
					Rail	Road (Urban)	Road on-Urb	Ąi	Pub	Slow	Rail	Road (Urban)	Road on-Urb	Air	WM	Short Sea	Maritime					
							Ž		-				Ž			S	-					
	ಕ್ತು	ts	7	Volume [passenger/tons]		⇒	⇒					⇒	⇒									
	Indirect Traffic	pac	8	Transport performance [vkm]		<b>→</b>	<b>†</b>					<b>→</b>	<b>†</b>									
	= ⊢	=	9	Transport performance [pkm/tkm]		⇒	⇒					⇒	⇒									
			10	Travel time [min]																		
		ŀ	11	Travel distance [km]																		
		ı	12	Out of pocket costs [EUR/vkm]		⇒	⇒					⇒	⇒					i				
		ر ا		Other cost components [EUR/vkm]		Ė	Ė					Ė	Ĺ					ĺ				
	Direct Traffic	pact	_	Qualitative effects (e.g. liability,)	l				1											Sectora	_	
	عَ ت	Ξ		Comments																		
					ĺ													를	tura	trial	oort	e se
																		Overall	Aggricultural	Industrial	Transport	Other Services
																			Age	=	F	S
		-	16	Economic growth [gdp]																	→	$\vdash$
	_	ŀ		Employment [#employed]																		
	Direct Economical	cts	_	Resources: Energy																	$\vdash$	$\vdash$
	Dire	mpa		Resources: Material																	⇒	-
	ä	-		Other																	ш	Щ
		ŀ	_	Comments																		
				Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social	pact																				
	ig 8	Ξ		Other Comments																		
	70		_	GHG emissions [g/vkm]		١	ν.		1	I		- N	Δ.			I						
	e 4	cts		(Local) air pollution [g/vkm]		7	7					7	- A									
	Dire	m pa	_	Other		⇒	⇒					⇒	⇒									
	Direct Environme ntal	- 1		Comments																		
	io				phy	es «	a a	ء ہا		ent												
	ıslat				ogra	Economy & Resources	Pas senger Demand	Freight Demand	Vehicle Stock	uuo	Safety											
С	TPM translation				Demography	Res	Pas	F 9	> 0	Environment	S											
	<u>1</u> 6	ŀ	29	HT Modules addressed by TPM	X	Х	Χ	Х	1	X	Х	1										
				Demography	n/a		^				^											
				Economy & Resources	n/a							j										
	ver			Passenger Demand	n/a																	
	5	ŀ		Freight Demand Vehicle Stock	n/a	eh_stoc	k (floor	nortfo	lio)			-										
	log		34	venicie stock		ap_rpcs				th VAT	١.											
	TPM policy levers	Į			i_vs_c	ap_tech																
		ļ		Environment Safety	n/a							1										
		<del>-  </del>	_	Comments	n/a							1										
		Ī		References	1. Dav	is, Willi	am, Lev	rine, Ma	rk, Trai	n, Kenr	eth,	ĺ										
						uleep, K																
						tes on \ le Emiss				Carbor	1											
						ıs", DOE				ebruary	1995.											
						man, Jo				Best P	ractices											
						ebate Pi nplemei				110												
						ene, Da																
						ret, and																
						es and g																
						ives for y Policy,																
						ene, Da					itial											
					Design	n, Imple	mentat	ion, an	d													
						its of a f			m for N	ew Pas	senger											
						les in Ca red for S			nia Air F	Resour	es	1										
						by Univ																
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						√anus, \ tes to R						1										
						ions fro					a",											
					Unive	rsity of I	Michiga	ın. May	2007. 6.	Nemry		1										
						te and s ean Con					ro											
					2009.	can CUII		, 301111	. nesedi	un cell		1										
		<del> </del>	48	Performed by	TML							1										
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# 1.2 TPM Templates already embedded in the EC Reference Scenario 2013

#### 1.2.1 Opening the Internal Rail Market (1)

			J	Ι.													1				
Section			Policy name		-	nternal	rail ma	rket													
Α		_	Policy Area		nal ma												-				
		_	Policy Category	1	al mark		arka+										-				
			Policy Subcategory Transport Policy Measure			ernal m		engers	narket	to com	netition	n, includi	ing mar	ndatory	award -	of	-				
			Tanapore i oney incasure					er comp				., maduul	<sub>5</sub> dl	.aatory	uwaiu i						
		5	Main Targets	_				_			_	o impro	ve the	attracti	veness,		ĺ				
												transpo	rtation								
								sation S				04)139 rail pass		norato	rc and						
												work, ass	-								
								engert			-,	,									
		6	White Paper Reference	1. An e	fficien	t and in	tegrate	d mobil	ity syst	em							ĺ				
					-			ort Are													
				Initiati	ve 1: A	true int	ernal r	narket f	or rail s	ervices											
		_																			
В				-	_	Pass	enger	_	1			1	Freight	<u> </u>	1	_					
				Rail	Road (Urban)	Road (Non- Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non- Urban)	Air	WWI	Short Sea	Maritime					
	+ s	7	Volume [passenger/tons]	ı		0				<b>→</b>											
	Indirect Traffic Impacts	8	Transport performance [vkm]	1		0				⇒							ĺ				
	<u> </u>	9	Transport performance [pkm/tkm]	1		2		<b>†</b>		⇒							1				
		_	Travel time [min]	+"		73	$\vdash$	1	-	+-							-				
			Travel distance [km]			ļ	1	<u> </u>	<u> </u>	<u> </u>		1		<u> </u>	-		-				
				<b>!</b>			-			<u> </u>							-				
	,,		Out of pocket costs [EUR/vkm]	7			1	1		1							-				
	Direct Traffic Impacts		Other cost components [EUR/vkm]					<u> </u>		<u> </u>											
	戸투류		Qualitative effects (e.g. liability,)	_		crease											ļ		Sectora	<u> </u>	
		15	Comments									inal. The					=	ura	<u>=</u>	t o	- x
												pes of co		passen	ger train	is). Ine	Overall	Aggricultural	Industrial	Transport	Other
		_	Economic growth [gdp]														⇒	⇒	⇒	1	⇒
	. = s	_	Employment [#employed]														⇒	⇒	⇒	1	⇒
	Direct Economical Impacts		Resources: Energy																		
	<u> </u>	19	Resources: Material																		
	_		Other																		
		_	Comments	Gover	nment:	saves m	oney ir	puplic	procur	ements											
	ial at	22	Safety [#accidents/vkm, #fatalities/vkm]	⇒						⇒											
	Direct Social Impacts		Other																		
		_	Comments											1	1						
	t enta	_	GHG emissions [g/vkm]	1		9															
	Direct ironmen Impacts		(Local) air pollution [g/vkm]	1		9															
	Direct Environmental Impacts	_	Other																		
	Ъ	28	Comments	<u> </u>																	
	tion			Demography	ny &	ger	t b	a ×	Environment	>											
	TPM translation			ogra	Economy & Resources	Passenger Demand	Freight Demand	Vehicle Stock	ronr	Safety	1										
_	/ tra			Derr	Eco Res	Pa	ا ۾	> ''	Envi	,	1										
С	TPA	20	HT Modules addressed by TDM	.,	.,	,	-	<del>  ,</del>	<b>.</b>	.,	1										
		_	HI Modules addressed by IPM	X	Х	✓	√	✓	X	Х	1										
			Demography L Economy & Resources	n/a n/a							1										
	ers		Passenger Demand		e time	_weigh	t,				1										
	TPM policy levers	Ĺ						fservice	2)												
	Jicy	33	Freight Demand					juency i		e of											
	2 20			passer	nger tra	ins)															
	Ē		Vehicle Stock		f_rail_c	thc (no	n fuel o	peratio	nal cos	t)	1										
			Environment	n/a							1										
			Safety Comments	n/a Ouant	ficatio	n requir	es kno	wing pa	ssenge	r	1										
		3/	- Comments					nge, this			1										
				requir	e know	ing wha	t part o	f PKM/1	trip gro	wth is											
								HIGH-T			1										
								he incre		ait	1										
		1-	References					by the ssment		Social	1										
		"	THE TELES					insport l		Jourdi	1										
								tzinger		(013)	1										
		48	Performed by	KIT							1										

#### 1.2.2 Access to Rail Infrastructure (4)

Section			0 Policy name	Access	to rail	infrasti	ructure										1				
A		_	1 Policy Area		nal ma												1				
			2 Policy Category		al mark												1				
		Г	3 Policy Subcategory	5.1.2 R	ail - int	ernal n	narket										1				
			4 Transport Policy Measure					scrimina													
					es, in pa e provis		r throug	h struct	ural sep	paratio	n betw	een infi	astruct	ure mai	nageme	nt and					
			5 Main Targets	Impro marke		discrim	ninatory	access 1	to rail ir	ıfrastrı	icture t	o enhar	nce com	petitio	n in the	rail					
		Ī	6 White Paper Reference	1. An e	efficien		-	d mobil oort Are		em											
		L						narket f		ervices			,								
В		F				Pace	enger						Freigh								
						-	T					2		<u> </u>	Ι.		1				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
	# s	T	7 Volume [passenger/tons]	1		9	0			⇒		Ť					1				
	Indirect Traffic Impacts		8 Transport performance [vkm]	1		0	0			⇒							1				
	5 ≒ ₹	r	9 Transport performance [pkm/tkm]	1		0	0			⇒							1				
		1	0 Travel time [min]	<u>"</u>		- 2	73			⇒		1	1				1				
		╙	1 Travel distance [km]	72						7			1				┨				
		_	2 Out of pocket costs [EUR/vkm]										-				1				
		_	3 Other cost components [EUR/vkm]	-													-				
	ffic acts			8		<u> </u>		L		⇒	<u>.</u>	<u> </u>	<u> </u>		Щ.		-				
	Direct Traffic Impacts	1	4 Qualitative effects (e.g. liability,)		es num conne		ransfer	and inc	reases t	ne ser	vice lev	el (wai	ting tim	e, same	operat	or,			Sectora	1	
		1	5 Comments				fers to 1	he dom	estic m	arket a	nd pass	engert	ranspo	t. The i	mpact o	n rail	1	<u></u>	_		
								narginal									Overall	Aggricultural	Industrial	Transport	Other Services
		1	.6 Economic growth [gdp]														⇒	⇒	⇒	n	⇒
	_	_	7 Employment [#employed]														⇒	⇒	⇒	7	→
	Direct Economical Impacts		8 Resources: Energy			1					1	+			1	1	-	-		"	
	Direct conomica Impacts	$\vdash$	9 Resources: Material										1								
	_ 8 =	_																			
		_	O Other 11 Comments	Accum	ing the	total d	omand	for tran	cnort in	crosco	dosnit	of mo	dal chif								
		_	2 Safety [#accidents/vkm, #fatalities/vkm		IIIIg tile	totalu	emanu	TOT LEATE	Sport III	crease	despiti	1 1110	uai siiii	T		Ι	1				
	Direct Social Impacts	ш		9								ļ	ļ				4				
	멸망빨	_	3 Other 4 Comments	+													-				
	B		5 GHG emissions [g/vkm]			1										1	1				
	cts ne ct		6 (Local) air pollution [g/vkm]	-		-					-	-		-	-	-	┨				
	Direct Environmenta I Impacts	٠Ļ	7 Other		<u> </u>	ļ			<u> </u>	<u> </u>						ļ	4				
	Envi		8 Comments														1				
	<u>.</u>			γhς	⊗ s	a b	70		ent												
	TPM translation			Demography	Economy & Resources	Passenger	Freight	Vehicle Stock	Environment	Safety											
С	tran			emo	Resc	Pass	Pr-P	s v	Ş	Sa											
	₹	H	9 HT Modules addressed by TPM			_	· ,	,													
		_		Χ	X	✓	✓	✓	Χ	Χ	1										
			Demography 1 Economy & Resources	n/a n/a																	
	levers		2 Passenger Demand	_	e_time	weigh	nt.														
		-						fservice	2)												
	TPM policy	3	3 Freight Demand		wait_tir																
	Σ		4 Vehicle Stock		f_rail_c	othc (no	on fuel o	peratio	nal cost	1)											
	_		5 Environment 6 Safety	n/a																	
		_	7 Comments	n/a Freigh	t is effe	ected in	directly	due to	freque	ncv	1										
		ľ	Commence				er trains		cque.	,											
		4	7 References	Europ	ean Cor	nmissio	on (1991	): Coun	cil Direc	tive of											
								nent of	the												
				COmn	nunity's	railwa	ys														
				Furon	aan Cor	nmiccia	n (2000	): Propo	sal for	2											
								rliamer													
				Counc	il Amer	nding, C	ouncil I	Directive	91/440	)/EEC											
				on the	develo	pment	of the	Commu	nity's ra	ilways											
				Furthe	rnalia	اميرما		s for the	futuro												
							way pac		ruture												
								): The F	ourth R	ailway											
								ngle Eur													
						to Fost	er Euro	ean Co	mpetiti	veness											
				and Gr	owth																
				Steer	Davies	Gleave	(2012)	Further	Action :	at											
								larket O													
		1						ort by Ra													
								y Access													
		1		Infrast	ructure	and Se	rvices,	London.													
		4	8 Performed by	Ĺ																	
											_										

## 1.2.3 Single European Sky (6)

Section		0	Policy name	Single	Europe	an Sky											1				
A			Policy Area				ation /	6 Infras	tructure								1				
•		_	Policy Category		al mark		raciony	Ommas	tructure												
			Policy Subcategory		echnol												1				
								ransport													
		_	Transport Policy Measure Main Targets	_				_		_		in the a				u in nir					
		3	Iviaiii Taigets									nsport b									
					osts by																
		6	White Paper Reference	1. An e	fficient	t and in	tegrate	d mobil	ity syst	em											
								oort Are													
				Initiati	ve 2: Co	omplet	ion of t	he Singl	e Europ	ean Sky	У										
_						_										_					
В					1	_	enger	1	1			_	Freight	_	1	1					
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
		7	Volume [passenger/tons]	<b>3</b>	_ 5	-	1	a E	2		- 3	-	P		-ks	Š					
	Indirect Traffic Impacts		Transport performance [vkm]			7	+					7	-								
	Trai			7		9	1					9	1								
			Transport performance [pkm/tkm]	7		7	1					7	1								
			Travel time [min]				9						9								
		11	Travel distance [km]				0						0								
		12	Out of pocket costs [EUR/vkm]				⇒						⇒								
		13	Other cost components [EUR/vkm]				0						4								
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)	Decrea	se of d	elays a	nd canc	elled fli	ghts										Sectora	1	
	Tra H		Comments	Impac	ts on su					red by	other et	ffects (i	ncrease	of acc	ess/eg	ress					
				goods	ditiona within nvenie	the Eur	opean I	Econom	ic Area	and wit	h the re	ow conti est of the market,	e World	l. Cont	inued n	obility	Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]																	1	
		17	Employment [#employed]																	1	
	<u>.</u>	18	Resources: Energy																	⇒	
	Direct Economical Impacts	19	Resources: Material																		
	声였다	20	Other	Additi	onal cre	eation o	of indire	ct and i	nduced	emplo	yment										
	ŭ																				
		21	Comments		yment i			onstant	(traffic	growth	compe	nsates),	deman	d gene	ration	effect in	n air larg	er than	the de	mand	
	ਰ ਜ਼ਿਲ੍ਹੇ ਹੋਰ ਜ਼ਿਲ੍ਹੇ	22	Safety [#accidents/vkm, #fatalities/vkm]				0						4								
	Direct Social Impacts		Other	Also n	oise red	duction	by up t	o 10% ir	vicinit	y of airp	ports in	tended									
			Comments		_			1								,					
	Direct Environmenta I Impacts		GHG emissions [g/vkm]																		
	Direct /ironme        mpacts		(Local) air pollution [g/vkm]																		
	ءَ ڏِ ٿ	_	Other																		
	ш	28	Comments												_						
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
_	ΓPΜ	20	HT Modules addressed by TPM	X	X	/	V	/	Χ	/	1										
			Demography	n/a	^	_ v		V	^	V	1										
			Economy & Resources	n/a																	
	s		Passenger Demand		ink_tim	e_weig	ght,														
	TPM policy levers				mp_del	ta_los	(level o	fservice	e)												
	je cy		Freight Demand Vehicle Stock	n/a	f air n			nf_air_r	ooo fr	o Inon											
	<u> </u>	34	venicie stock		relate				ieue_ii	e (IIOII											
	₽	35	Environment	n/a				-,													
		36	Safety	i_sa_rı	unway_	collisio	n_air,														
					nid_air_																
		37	Comments					minor i													
								Therefo													
								VA and			ĺ										
								t on lon			ĺ										
		47	References		//www.						Ī										
								ss/inde													
				_				&id=467	:1401-si	ngle-	l										
					ean-sky catid=1				SAR E.	ronean	J										
					catid=1 1aster P		gemer	SE	SAR, Eu	opean	Ί										
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				SESAR	, SESAR	focus:		s-the A1			l										
					neck?, 2	2011	S	ESAR, P	resenta	tion of											
		ı		the							1										
				MACVIC	COV NA-	oro For	nomic -	tudy ~	111												
				McKin	sey Mad	cro-Eco	nomic s	tudy, 20	011												
				Safety	:																
				Safety Minist	: erie var			tudy, 20		sal											
		48	Performed by	Safety	: erie var					sal											

## 1.2.4 Enhance Service Quality at Airports (8)

Section			D Policy name	Enhan	ce serci	ce qual	itv at ai	rports									1				
A			1 Policy Area		nal mai			•									1				
			2 Policy Category		al mark												j				
			Policy Subcategory			nal mar															
		+	4 Transport Policy Measure					anspor			lo guali	ty servi	cos inc	luding			-				
			Transport Policy Weasure									n meet		_	ity stan	dards.					
			5 Main Targets	checks invest	at airp ments,	orts for especia	the be	nefit of ough the	passen use of	gers an	d other tive fin	lines. In stakeho ancial ir	olders. Istrume	Encoura ents, so	age as to st	eer					
						of the v															
			6 White Paper Reference	1.1 A S	ingle E	uropea	n Transı	d mobi oort Are ality of	a				1								
В		Т				Pass	enger						Freigh	t							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow	Rail	Road (Urban)	Road (Non-Urban)	Air	IWW	Short Sea	Maritime					
	# 0.8		7 Volume [passenger/tons]	0			1						1				1				
	Indirect Traffic Impacts		8 Transport performance [vkm]														1				
	ĔŤĒ		9 Transport performance [pkm/tkm]	0		l	1				l		1				ĺ				
		1	O Travel time [min]	+-			7	t		<b>1</b>	<u> </u>		2	t -			i				
			1 Travel distance [km]				<b>—</b>										1				
		_	2 Out of pocket costs [EUR/vkm]				8						0				1				
	# := #	1	Other cost components [EUR/vkm]				-						-								
	Direct Traffic Impacts	_	4 Qualitative effects (e.g. liability,)	Equal	quality	standar	ds acro	ss the E	U increa	ases the	averag	ge servi	e and	comfort	level.		1		Sectora		
	_		Comments	While large a	travel /	transp , the ef	ort time fects m	and co	st savin exist o	ıgs can l r even l	ead to be reve	possitiv rse at sr	e effec	ts on m	edium		Overall	Aggricultural	Industrial	Transport	Other Services
		_	6 Economic growth [gdp]														⇒	⇒	⇒	1	⇒
	👨 🔊	_	7 Employment [#employed]														⇒	⇒	⇒	1	⇒
	Direct Economical Impacts	_	8 Resources: Energy																		
	_ P P F	1	9 Resources: Material																		
		_	O Other 1 Comments									differe	ntiatio	n for sm	all airp	orts.					
		_	2 Safety [#accidents/vkm, #fatalities/vkr		rtimpr	oves so	cietai a	nd culti	urai iink	S to otr	ier regii	ons.		I							
	Direct Social Impacts		3 Other	1	<u> </u>			1		<u> </u>	<u> </u>						-				
	ig S <sub>E</sub>		4 Comments	+													1				
	<u></u>	2	GHG emissions [g/vkm]				⇒						⇒								
	ts ent	2	6 (Local) air pollution [g/vkm]				0						0				ĺ				
	Direct ironmen Impacts	2	7 Other			-				I	-										
	Direct Environmental Impacts	2	8 Comments					crafts a local en			e the a	Iternati	ve usag	ge of the	eir auxi	liary					
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
	₽		9 HT Modules addressed by TPM	Χ	Χ	✓	✓	✓	Χ	Χ	ļ										
			Demography	n/a							<del> </del>										
			1 Economy & Resources 2 Passenger Demand	n/a	o tima	_weigh	ıt				1										
	levers		3 Freight Demand	i_pd_i	mp_del		level o	f servic	e)												
	TPM policy levers			p_fd_u imped	inload_ ance in	time, p	_fd_sp	eed (to													
	_ ₽	3	4 Vehicle Stock			eoe_pa d varial		nf_air_ı s)	neoe_fr	e (non											
			5 Environment	n/a																	
			6 Safety	n/a							ļ										
			7 Comments 7 References	httn:/	PC PILL	nna eu	transn	ort/mod	les/air/	airnort	1										
		4	, mererendes	s/polio http:// lex.eu	cy_en.h 'eur- ropa.eu	tm ı/LexUr	iServ/L	exUriSe													
		Ļ	P Dorformed by			IN:EN:	HTML				ļ										
		4	8 Performed by	MKme	tric						J										

## 1.2.5 Single European Road Market (16)

Section		0	Policy name	Single	Europe	an road	marke	t									1				
A		_	Policy Area		nal mai												1				
		_	Policy Category		al mark												1				
			Policy Subcategory			ernal m	arket										1				
			Transport Policy Measure	Elimin	ation o	f restric	tions o	n road c	abotage	2											
		5	Main Targets					road tra	nsport i	narket	by elin	ninating	the res	triction	s on cal	ootage,					
				_		iberalis															
		6	White Paper Reference					d mobil		em											
						uropear oad frei		port Are	а												
				IIIILIAL	ve o. K	Jau IIei	giit	_			_	_									
В						D	enger						Facilia								
Ь				-	l .	1	enger	1	Ι		T	Τ _	Freigh	1	l .	1	_				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WW	Short Sea	Maritime					
					=	S)		- E	_		=	<sup>2</sup>			- R	Σ					
		7	Volume [passenger/tons]							0		1	⇒								
	Indirect Traffic Impacts		Transport performance [vkm]									+ -	_				-				
	Tra m			-			-	-	-	7		9	⇒			-	4				
			Transport performance [pkm/tkm]							9		0	⇒								
		10	Travel time [min]																		
		11	Travel distance [km]																		
		12	Out of pocket costs [EUR/vkm]									0									
	# :: #	13	Other cost components [EUR/vkm]	1						l	1	9					i				
	Direct Traffic Impacts	14	Qualitative effects (e.g. liability,)	1	-	1					1	72				1	+		Sectora		
	<u>s</u>		Comments									nd accor		otal ve	hicle		Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]														⇒	⇒	⇒	⇒	⇒
		17	Employment [#employed]														⇒	⇒	⇒	1	⇒
	<u></u>	18	Resources: Energy														⇒	⇒	⇒	⇒	⇒
	Direct Economical Impacts	19	Resources: Material																		$\overline{}$
	mp On Oir	20	Other																		$\dashv$
	<u> </u>	20	other																		ļ
		21	Comments									ht incre sector is				duction	in road	d transp	ort. The	refore, 1	the
	# = #	22	Safety [#accidents/vkm, #fatalities/vkm	]																	
	Direct Social Impacts	23	Other									-					1				
	o s E	_	Comments														i				
	nta	25	GHG emissions [g/vkm]																		
	Direct ironme I Impacts	26	(Local) air pollution [g/vkm]														1				
	Direct Environmenta I Impacts	27	Other	1						l		-					1				
	Env		Comments																		
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight	Vehicle Stock	Environment	Safety											
	_ ≥	29	HT Modules addressed by TPM	X	Х	Х	<b>√</b>	<b>√</b>	X	Χ	1										
		30	Demography	n/a							1										
	ers		Economy & Resources	n/a							1										
	lev lev	32	Passenger Demand	n/a																	
	olic,		Freight Demand	p_fd_l	oad_fa	ctor (Av	erage l	oad rate	e)												
	TPM policy levers		Vehicle Stock		f_mar_	opcost (	non fu	el opera	tional o	ost)											
	₽		Environment	n/a																	
			Safety Comments	n/a							1										
		47	References	and Ed Measu 2013). Innova InnoSi (PIR), Vellay	onomic ires, Fac ation Pr uTra (20 Deliver	ocesses 10): Pre able D 2	s of Tra No. 22 in Sur limina !.1.	essment ensport (Kritzin face Tra ry Innov , A. (201 reight tr	Policy ger et a nsport - ration R	l., eport											
				emissi conge FREIGI Sugge No 107 (http:/	ons, de stions a HTVISIO sted TP 72/2009 1/ec.eur	pender nd accid N. M exced	nce on dents. I	vironme fossil fu Delivera existin port/mo tage_re	els, ble 6.1 g Regula des/roa	ation d/haul											
		48	Performed by	KIT							1										
		-																			

## 1.2.6 Improvement of Energy Efficiency of Vehicles (50)

Section		С	Policy name	Impro	vement	of ene	rgy effic	ciency c	f vehicl	es							1				
A		_	Policy Area		arch an			-									1				
		2	Policy Category		rch and												1				
		3	Policy Subcategory		ehicle												i				
		4	Transport Policy Measure	Techn	ological	innova	tion on	vehicle	efficie	ncy thr	ough ne	ew engi	nes, ma	terials	and des	ign	1				
		5	Main Targets	Furthe	er impro	vemen	t of ene	rgy effi	ciency o	of all ve	hicles;	reduce	CO2-er	nission	s, decre	ase	ĺ				
					y demar												ļ				
		6	White Paper Reference						ogy and												
									and Inno	ovation	Policy										
		<u> </u>		Initiat	ive 24: A	A techno	ology ro	admap									J				
В						Pass	enger						Freight	t							
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	IWW	Short Sea	Maritime					
		7	Volume [passenger/tons]							⇒		⇒		⇒	⇒	⇒					
	Indirect Traffic Impacts	8	Transport performance [vkm]									<u> </u>		Ė	Ĺ		1				
	혈급별	Ľ.															ļ				
		9	Transport performance [pkm/tkm]														ļ				
		10	Travel time [min]																		
	1	11	Travel distance [km]														1				
	1		Out of pocket costs [EUR/vkm]	<i>b</i>	0	⇒	0	9	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	0	<i>b</i>	0	<i>₽</i>	<i>b</i>	0	9	1				
	7 . N		Other cost components [EUR/vkm]		+	<del> </del>	+	_			<del> </del>	1		+		<b>-</b>	<del> </del>				
	Direct Traffic Impacts			1	1	1	1	1	1	1	1	1	1	1	1	1	1				
	<u> </u>	14								_									Sectora		
		15	Comments	costs a		cially ir	n the in		due to								Overall	Aggricultural	Industrial	Transport	Other
		16	Economic growth [gdp]														⇒	1	1	î	<b></b>
	_	17	Employment [#employed]														⇒	⇒	1	<b>↑</b>	⇒
	Direct Economical Impacts	18	Resources: Energy														⇒	⇒	1	4	⇒
	Dire	_	Resources: Material																		
	8 =																⇒	⇒	⇒	⇒	⇒
			Other Comments																		
			Safety [#accidents/vkm, #fatalities/vkm]																		
	ial acts																ļ				
	Direct Social Impacts	_	Other														ļ				
			Comments	L													ļ				
	Direct Environmenta I Impacts	25	GHG emissions [g/vkm]	₩	₩	₩	₩	₩		₩	₩	₩	₩	₩	₩	₩	ļ				
	Direct ironme I	26	(Local) air pollution [g/vkm]		0	1	1	0		0	0	<b>⊘</b>	0	1	0						
	ig iš į	27	Other														ĺ				
	툽	28	Comments														j				
С	TPM translation			Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
	Ę	29	HT Modules addressed by TPM	Χ	Х	Х	Х	<b>√</b>		Х											
		_	Demography	n/a		· /	· /		<u> </u>												
		_																			
	ers																				
	<u>s</u>		Freight Demand	n/a																	
	Ş		Vehicle Stock	i_vs_c	ap_rpcs	_mkt (v	ehicle p	orice wi	th VAT)	,											
				i_vs_c	ap_tech	(vehicl	le tech i	related	capital	costs)											
	<b>E</b>	35	Environment			r (emiss	sion and	d/or fue	l consu	mption											
		L		factor	s)																
			Safety	n/a																	
		37																			
				100111		and co	14/2012	\10 TDE	NAONE		İ										
		47	References																		
		47	References	simula	ations o				ds (seve	ral											
		47	References	simula refere	ations o	n C02 &	EURO-s	standar	ds (seve												
		47	References	simula refere	ations o nces: /www.t	n C02 &	EURO-s	standar													
	TPM policy levers	31 32 33 34 35	Economy & Resources Passenger Demand Freight Demand Vehicle Stock Environment Safety Comments	n/a n/a n/a i_vs_c i_vs_c i_ev_e factors n/a	ap_tech emfacto s)	(vehicl	le tech i	related d/or fue	capital (	costs)											

## 1.2.7 New Fuels and Propulsion Systems (51)

Section		0	Policy name	New fu	uels and	d propu	lsion sy	stems									1				
A		_	Policy Area			d innov											1				
		2	Policy Category	Resear	ch and	innovat	tion														
			Policy Subcategory	3.1.1 V	ehicle	Technol	ogy														
		4	Transport Policy Measure								sion sys	tems to	achiev	e clean	er ener	gy use					
		<u> </u>	=					nd freig													
		5	Main Targets					neratio NG, LPG		els; inc	reased	oenetra	tion of	electri	vehicle	es and					
		- 6	White Paper Reference					technol		hehav	iour						1				
		ľ	Time raper neverence					search a													
							ology ro														
В		_				Pacc	enger						Freight				1				
							enger						rieigiii				1				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	WW	Short Sea	Maritime					
		7	Volume [passenger/tons]														1				
	Indirect Traffic Impacts	_	Transport performance [vkm]	ļ	-		-	-		<b>-</b>		<b>-</b>		-		-	1				
	in Tag	_																			
			Transport performance [pkm/tkm]			ļ											<u> </u>				
		10	Travel time [min]	L_				<u>L</u> _	<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u>L</u>							
		11	Travel distance [km]																		
		12	Out of pocket costs [EUR/vkm]	⇒	n	1	1	1		n	1	1	1	1	1	1	1				
	ਸ਼ੂੰਦ ਵੇ	13	Other cost components [EUR/vkm]	<b>→</b>	1	1	7	7		1	1	7	1	1	7	1	i				
	Direct Traffic Impacts	_	Qualitative effects (e.g. liability,)		1	17		1 7		7	1		-7	1 7	1 7	1	1	Ь.	Sectora		
			Comments																- CCCCOTA		
																	Overall	Aggricultural	Industrial	Transport	Other
		16	Economic growth [gdp]														0	⇒	⇒	<i>b</i>	⇒
	_	17	Employment [#employed]														0	⇒	⇒	<b>₩</b>	⇒
	Direct Economical Impacts	18	Resources: Energy														⇒	⇒	⇒	<u> </u>	⇒
	Dire	_	Resources: Material														-	-	_		
	8 -		Other																		
		-	Comments																		
	v		Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts	23	Other					ļ	l			ļ									
	<u> </u>	_	Comments														1				
	ţa.		GHG emissions [g/vkm]	<b></b>	↓	₩	0	1		0	₩.	₩.	<i>\\</i>	<b>8</b>	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	8	ĺ				
	Direct Environmenta I Impacts	26	(Local) air pollution [g/vkm]	⇒	ı	Į.	<u> </u>	Ů.		-	ı,	ı,	<u>~</u>	- W	- W	9	1				
	Direct rironmer l	27		_	•	. •	_ <u>u</u>	. •		7	. •			_ <u>u</u>	73	73	1				
	E E		Comments														1				
																	1				
С	TPM translation			<b>Demography</b>	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
	TA TA	29	HT Modules addressed by TPM	Χ	Х	Χ	Χ	/		Х	1										
		_	Demography	n/a							t										
			Economy & Resources	n/a																	
	ē	32	Passenger Demand	n/a																	
	cy levers		Freight Demand	n/a																	
	Ş	34	Vehicle Stock				portfol														
	9							orice wi		,											
	TPM poli	35	Environment					d/or fue		mntion											
		Ľ		factors		,		,		.,											
			Safety	n/a																	
			Comments					c cars, 6		cars.	1										
		47	References					)18. TRE			1										
		1				n C02 &	EURO-s	tandaro	is (seve	eral	1										
				refere http:// me.htr	www.t	mleuve	n.be/m	ethode	/tremo	ve/ho											
		48	Performed by	TML																	

## 1.2.8 CO<sub>2</sub> Emissions Limits for Road Vehicles (64.1)

Section		0	Policy name	CO2 er	nission	s limits	for road	dvehicl	es												
Α		1	Policy Area	4 Effici	ency st	andards	and fla	nking r	neasure	es											
			Policy Category		_	ndards a			easures												
			Policy Subcategory			nental s															
		4	Transport Policy Measure			limits f m new v					et to si	mulate r	estricti	ive limi	ts on CC	02					
		5	Main Targets								rove the	e fuel ef	ficienc	v of ne	w						
												s in redu									
				from n	ew veh	icles.															
		6	White Paper Reference	2.1. A I	Europea	an trans	port res	earch a	nd inno	ovation	policy,	i.e. (26)	A regu	latory f	ramew	ork for					
											e sustaii	nable be	haviou	ır,.i.e. (	28) Veh	icle					
		Ш		labelli	ng for C	O2 emi	ssions a	nd fue	efficie	ncy							_				
		$\vdash$															1				
В						_	enger						Freight			1	1				
				Rail	Road (Urban)	Road (Non-Urban)	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban)	Air	ww	Short Sea	Maritime					
	2 t	7	Volume [passenger/tons]	1	0	<i>b</i>				1	0	0									
	Indirect Traffic Impacts	8	Transport performance [vkm]	1	0	1				1	0	0				Ì					
	<u>≅</u>	9	Transport performance [pkm/tkm]	7	0	2				7	<u> </u>	<u>~</u>					1				
			Travel time [min]	<del>- </del>		-				<del>'</del>	<b>—</b>				1		1				
			Travel distance [km]	-							<del>                                     </del>						1				
			Out of pocket costs [EUR/vkm]								-	2					1				
			Other cost components [EUR/vkm]		1	1					1	1					-				
	Direct Traffic Impacts		Qualitative effects (e.g. liability,) Comments														-	<del>- '</del>	Sectoral	_	-
	_																Overall	Aggricultural	Industrial	Transport	Other Services
		16	Economic growth [gdp]																⇒	⇒	
	_	17	Employment [#employed]																	<u> </u>	$\vdash$
	Direct Economical Impacts	18	Resources: Energy																⇒	⇒	<del>                                     </del>
	Pic Oir		Resources: Material																-	_	$\vdash$
	B -		Other														-		ш		
			Comments																		
	v		Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social Impacts		2.1														1				
	<u> </u>	-	Other Comments														-				
	<u> </u>		GHG emissions [g/vkm]		<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>											1				
	Direct Environmental Impacts		(Local) air pollution [g/vkm]		⇒	⇒											1				
	Direct /ironmen Impacts		Other								ļ						1				
	Ē.		Comments																		
С	TPM translation			Demography	Economy & Resources		Freight Demand	Vehicle Stock	Environment	Safety											
	Ē	29	HT Modules addressed by TPM	Χ	X	Χ	Χ	✓	✓	Χ											
			Demography	n/a																	
	ers		Economy & Resources	n/a																	
	/lev		Passenger Demand Freight Demand	n/a n/a																	
	į		Vehicle Stock		an rocs	_mkt (v	ehicle r	orice wi	th VAT)												
	TPM policy levers					(car ca			,												
	₽		Environment			r (emiss			l consu	mption	]										
			Safety	n/a																	
			Comments	A CC:C			20				-										
			References Performed by	TML	ract sh	eet no.	აგ.				1										
		+0	. c. o. med by	TIVIL		-															

## 1.2.9 Pollutant Limits for Road Vehicles (64.2)

Section			0	Policy name	Polluta	ant limit	ts for ro	ad veh	icles													
A			1	Policy Area			andards			neasure	es											
				Policy Category			ndards a															
			3	Policy Subcategory	4.1.3 E	nvironn	nental s	tandar	ds													
			4	Transport Policy Measure	Standa	rds for	control	ing air	pollutio	n (CO,	NOx, p	articulat	te matte	er). Poli	icy set t	o simul	ate					
					restric	tive lim	its on p	ollutan	t emiss	ions fro	m new	vehicle	s (cars a	and true	cks).							
			5	Main Targets								rove the					/II and					
					more)																	
		ļ	6	White Paper Reference																		
В							D							Facilities								
Ь							Passo	enger					_	Freight	<u> </u>							
					Rail	Road (Urban)	Road (Non-Urban	Air	Public Transport	Slow Modes	Rail	Road (Urban)	Road (Non-Urban	Air	ww	Short Sea	Maritime					
	# 0	s	7	Volume [passenger/tons]	ħ	0	0				1	0	0									
	Indirect Traffic	pact	8	Transport performance [vkm]	n	0	0				n	0	0									
	==	≐	9	Transport performance [pkm/tkm]	n	0	0				1	0	<i>\\</i>									
			10	Travel time [min]																		
			11	Travel distance [km]																		
			12	Out of pocket costs [EUR/vkm]		n	n					1	1									
			_	Other cost components [EUR/vkm]		-	7					-	-									
				Qualitative effects (e.g. liability,)		ļ					<u> </u>								_	Sectora		
	Direct Traffic	acts		Comments																Jectional Property of the Prop		
																		Overall	Aggricultural	Industrial	Transport	Other Services
			16	Economic growth [gdp]																⇒	⇒	
	_			Employment [#employed]																		
	nica is	cts	_	Resources: Energy																⇒	⇒	
	Direct Economical	lmpa		Resources: Material																7		
	_		20	Other																		
			21	Comments																		
		ы	22	Safety [#accidents/vkm, #fatalities/vkm]																		
	Direct Social	pact																				
	οš	트		Other																		
	<u></u>			Comments GHG emissions [g/vkm]																		
	Direct Environmental	acts		(Local) air pollution [g/vkm]		⇒	⇒ '\sigma'															
	ig ig	Ĕ	27	Other												-						
	Ē			Comments																		
С	TPM translation				Demography	Economy & Resources	Passenger Demand	Freight Demand	Vehide Stock	Environment	Safety											
	Į d		29	HT Modules addressed by TPM	Χ	Х	Χ	Χ	<b>√</b>	<b>√</b>	Χ	1										
			30	Demography	n/a							1										
	Si		31	Economy & Resources	n/a																	
	eve		32	Passenger Demand	n/a																	
	5			Freight Demand	n/a																	
	TPM policy levers	.	34	Vehicle Stock			_mkt (v			th VAT)	,											
	1 4		25	Environment			(car ca			l cons	mntica	1										
	_			Safety	n/a	dCtO	r (emiss	ion dil	a, or rue	LOUISU	puor	1										
				Comments	.,, u							†										
				References	ASSIST	fact sh	et no. 3	9.				1										
					TML							1										
								_		_		-										

